# Representing science education in UK newspapers : a case study on the controversy surrounding teaching the theory of evolution and creationism in science classes

## Thesis

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## A case study on the controversy surrounding teaching the theory of evolution and creationism in science classes

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*Abstract*

The thesis examines representations of science education in UK newspapers and focuses on the role of expert sources in a controversy about the teaching of creationism alongside the theory of evolution in science classrooms. The newspaper reporting revolved around the City Technology College Emmanuel College in Gateshead, mainly in Spring 2002.

The empirical research focused on two connected media elements: newspaper content and newspaper production. A quantitative and qualitative approach to analysing media content examined 287 newspaper articles from 20 UK newspapers, from 1 January 2002 to 20 February 2004, inclusive. The production analysis was based on semi-structured interviews with media professionals. The analysis of media content shows that the debate around Emmanuel College consisted of several related controversial issues. A range of expert sources were quoted in the articles, using various argumentation lines to address the issues of the controversy. The way expert sources were described by the journalists mainly seemed to enhance the credibility of those supporting the scientific consensus. Further analysis shows that some experts formed heterogeneous coalitions of experts calling for action. Collaborative networks of experts appeared as efforts to enhance credibility and gain access to the media. The evidence presented in this thesis points to the importance of understanding expertise not only in individual but also in collective terms and to investigate expertise in terms of the argumentation lines reported. The analysis of semi-structured interviews with media professionals demonstrates that the specialism of correspondents (e.g. on covering science or education) could influence which expert sources were selected, how they were represented and whether newspaper accounts were balanced or not. This influenced how reports were framed. Overall, the thesis demonstrates a more complex conceptualisation of expertise, one where experts are mobilised to conduct boundary work in key sites: media reporting and the National Curriculum for Science.

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# 1. Introduction

What members of the public know about science is the outcome of formal science learning, as in school science, and informal learning of science, such as the encounter with scientific contents and issues in the media (Millar and Wynne, 1988). Once formal science education is completed informal accounts of developments in science and technology such as through the media will be important sources of knowledge for most citizens (e.g. Nelkin, 1995). Both science education and science communication are therefore key sites for the image and knowledge members of the public have of and about science.

This study investigates a controversy about science education in UK newspapers. The issue of how education is covered in the media is an under-researched area and little work exists on media coverage of science education (see Baker, 1994, 2000; Pettigrew and MacLure, 1997; Jones, 2000; MacMillian, 2002; Hammersley, 2003; Ellsmore, 2005; Hargreaves et al., 2007). The research presented in this thesis makes a contribution by investigating representations of science education in British newspapers. In order to investigate this topic the thesis examines a debate about teaching religious accounts of the origins of life alongside the theory of evolution in science classrooms in secondary education, focusing on the representation of expert sources in newspapers. Here, the research examines the debate around the City Technology College Emmanuel College in Gateshead, reports of which caused a controversy around teaching creationism in science education in Spring 2002 and uses this debate as a case study.

It should be noted that it is not the intention in this thesis to make any normative statements about what should or should not be taught in science education. The aim of this study was to find out how this particular science education story was represented in British newspapers and which expert sources were quoted, how they were described and what they were saying about the debate. In order to investigate these issues empirically qualitative and quantitative analyses of media content were conducted. Furthermore, the research

presented in this thesis also investigated media production processes through interviews with media professionals and investigated whether particular professional practices or the specialism of correspondents had an influence on the selection and presentation of expert sources and what they were saying in the coverage of the debate.

## *1.1. The debate around Emmanuel College*

The literature on the situation of creationists challenging the teaching of the theory of evolution in Britain is limited (see Coleman and Carlin, 2004b; Fulljames and Francis, 2004; Locke, 2004; Numbers, 2006). However, some of these works mention that there was a creationist controversy around Emmanuel College in Gateshead mainly in the year 2002.

In January 2002 it was reported in a newspaper specialised in education coverage that educators at Emmanuel College in North England rented rooms to a creationist organisation that was going to hold a conference there in March (Dean, 2002, January 25). On the weekend the conference was held a series of articles in *The Guardian* accused the school of teaching creationism in science classes and undermining the theory of evolution (e.g. Branigan, 2002, March 9).

Emmanuel College was a school that consistently received excellent exam results. The Office for Standards in Education (OFSTED) wrote a very favourable report about the school. Another issue that was very important in the debate was that the school was partly funded by the state and partly by the private sector. The sponsor was Sir Peter Vardy's Vardy Foundation, a charitable trust with a Christian ethos. A member of the opposition picked up the issue of Emmanuel College being reported as teaching creationism in science classrooms in Parliament and addressed the Prime Minister about his views on the issue. Tony Blair backed the school for its good exam results, considered that the newspaper reports were exaggerated, and said that he welcomed diversity in education.

The issue of creationism being taught in science classes at Emmanuel College was also reported in scientific journals (e.g. Gross, 2002) and other media outlets (e.g. TV and radio news). Various action groups got together in the course of the controversy to write petitions and call for action concerning the controversy. Opponents of the school consistently claimed that religious "indoctrination" and "brainwashing" would take place and that the educators of the school and the Christian sponsor were "peddling" creationism in the school.

At the end of November 2003 it was reported in *The Guardian* that the issue over whether religious faith can peacefully coexist with evolutionary theory and science education had become "so pressing and pertinent" that the newspaper organised a one-day seminar on this topic[1] (Wignall, 2003, November 25).

Later the Vardy Foundation was renamed the Emmanuel School Foundation (ESF). The ESF website[2] noted that this was the result of the very negative press coverage Peter Vardy and the Vardy Foundation received during the debate around creationism being taught at Emmanuel College.

## *1.2. Expertise, expert sources and the media*

Broadly speaking expertise can be defined as the knowledge of specialized professionals (e.g. Haskell, 1984). Many specialized professions became autonomous through a system of credentials and some sort of formal training (e.g. Fuller, 1997). Professionalisation was in this regard a crucial prerequisite for the development of expertise (e.g. Larson, 1984). The formal training was needed to acquire the relevant knowledge and served the

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[1] "Creationism: Science and Faith in Schools" Guardian Newsroom Seminar, London, 1 December 2003. A summary of key points can be found online at: http://education.guardian.co.uk/conferences/story/0,,1117752,00.html (last checked 10 August 2007).

[2] For instance: "The Vardy Foundation became pilloried as a creationist propaganda machine, seeking to infiltrate state education and poison children's minds, and various of the great and good stepped into what became a very public debate." Whole overview of the ESF available online at: http://www.emmanuelctc.org.uk/overv.htm (last checked 13 August 2007).

enculturation of the novices into the professional culture (see Freidson, 1984 for discussion).

It has been argued that four or five decades ago the knowledge of experts was especially credible, respected and valued, but that in recent decades it has been increasingly challenged (Goldblatt, 2004a). For instance, the authority of the biomedical sciences about the best treatment of diseased human bodies has been challenged by homeopathic practitioners (Woodward and Watt, 2004), the authority of traditional religious leaders and institutions about the moral world has been challenged by various esoteric groups such as the New Age movement (Thompson and Woodward, 2004), and the authority of politicians on the socio-political world and of scientists on the natural world has been challenged by various social movements, such as ecological activists and environmental campaigners (e.g. Anderson, 1993; Coleman, 1997; Bromley, 2004; Cook, 2004). As a result, expertise itself and the question of who it is that has the relevant expertise in particular controversy contexts became areas of contestation (this topic will be further explored in Chapter 2, Section 2.1.1. - 2.1.2.).

Goldblatt (2004b) and Woodward et al. (2004) argue that the fact that schisms and debates between traditional authorities and their contestants are identified, popularized and reported in the media can lead to the perception of epistemological uncertainty by members of the general public and therefore to a decline of trust in expert knowledge. Visibility in the media can amplify the views, credibility and authority of actors that challenge the knowledge of traditional experts. Various types of experts, representing different forms of expertise and viewpoints, therefore struggle for access to the media in order to make themselves heard. For instance, McNair (2004: 6) asserts:

> "Journalists construct their narratives around their own values and beliefs, but these are necessarily informed by the contributions of a wide range of information sources, who thus acquire the power to become 'definers' of journalistic reality. Believable, 'true' journalism requires authentication and verification by non-

journalistic witnesses such as politicians, academics, professional specialists and other accredited sources of information and interpretation who lend their expert status to the text and give it authority in the eyes of the audience. Moreover, the journalistic demand for sources [...] encourages contemporary social actors to compete with ever-increasing sophistication and intensity for access to the media, using techniques of what has come to be known as public relations or news management. [...]. Source activity can thus be viewed as a means of ideological struggle."

This means that the media hold a powerful position in representing and giving some expert sources a voice whereas others may not be heard and stay invisible. The media therefore play an important role in publicizing new forms of knowledge as well as in re-constructing old orthodoxies. This issue is also of particular importance in public debates about creationism and the theory of evolution (e.g. McCune, 2003).

## *1.3. Science, religion and various forms of creationism*

Towards the end of the nineteenth century the cultural and epistemic authority of the church was challenged by a group of "scientific naturalists". Gieryn (1999) describes the resulting battles for the legitimate power to define and explain nature as one of the first instances how the emerging profession of scientists employed strategic practical actions that he describes as *boundary work* to demarcate the own field(s) of expertise from those of other professions. This battle between two occupations is today still often described as a more general conflict between religion and science (see Russell, 1989; Alexander, 2001; Ruse, 2005). This is particularly the case in media coverage of science and religion (Wilkinson, 2005). However, the manifold relationships between the various sciences and religions take on many different forms, not only the one of conflict (Brooke, 1991; Stahl et al., 2002).

Moreover, many scientists are believers themselves and produce acknowledged and valid scientific work (Berry, 1995; Brown, 2003). For instance, a survey conducted in the United

States found that about 40 percent of scientists believe in a personal God and an afterlife (Larson and Witham, 1997; 1999; Witham, 2002).

Some science educators argue that studying the complex relationships between science and religion can help to illuminate the nature of science and help to get a better understanding of what types of questions science can and cannot answer (e.g. Reiss, 1993; Poole, 1995; 1998; Bausor and Poole; 2003). However, debates around creation versus evolution have often been used to reaffirm a conflict scenario between science and religion (e.g. Alexander, 2001; Ruse, 2005; Numbers, 2006). Notwithstanding, there are many people, also scientists, who believe in a creator deity (or deities) and who, at the same time, also consider evolution to be scientifically valid (e.g. Polkinghorne, 1988; Gault, 2004). In this sense, acceptance and understanding of science and religious belief *can* and *does* coexist.

*Creationism* can generally be understood as a way (or ways) of explaining the world and the origin of life according to a belief, myth or theory where one or more supernatural deities created the world and life on the planet, no matter if this interpretation of the world agrees or is compatible with current (Western) scientific explanations or not. Most creationist accounts pre-date scientific explanations and several have existed throughout recorded human history.

Here it is important to note that the different creeds and beliefs of diverse religions often have very different ideas, accounts, myths and theories about the origins of human beings and the world. And also within a religious community interpretations of sacred texts and myths may sometimes vary considerably. The controversy around Emmanuel College investigated in this study primarily focuses on Judeo-Christian accounts of creation as opposed to current scientific explanations (based on evolution). However, Islam, Buddhism, Sikhism, Hinduism and other religions offer different creation myths and stories that can all be relevant to the members of multi-ethnic and multi-faith societies (e.g. Coleman and Carlin, 2004a).

Among Christian forms of creationism one finds a remarkable variety of beliefs (Scott, 2005; Numbers, 2006; Allgaier, 2005a). In this regard it is important to note that behind the different forms of creationism one also finds different theologies (Crews, 2001). Also different versions and rewritings of the Bible might be used as the basis of the various creationist interpretations and theories. Two positions that are particularly relevant for the case study presented in this thesis will be briefly introduced:

- *Young Earth Creationists* are probably the largest and most vocal group that is active in the United States and in Britain (e.g. Locke, 2004; Numbers, 2006). The key characteristic of Young Earth Creationism is the insistence on a "young" Earth that is about 6,000 – 10,000 years old. This belief is based on the calculations of Archbishop James Ussher made at the end of the sixteenth century, who used the genealogies given in the Bible to determine the day when God created in the Earth (e.g. Ruse, 2005; Numbers, 2006). The argumentation lines of Young Earth Creationists are based on literal readings of the Bible and they do not accept the approximated age of the Earth of 4.5 billion years, as calculated by scientists (e.g. Scott, 2005). It was claimed by critics such as the scientific expert Richard Dawkins (2002, March 18) that this was the position that was taught at Emmanuel College in science classrooms.

- Another prominent group of creationists that is also often present in current debates about teaching evolution in the media is the *Intelligent Design* movement. This movement is described as the most recent form of creationism to emerge (e.g. Numbers, 2006). This group of creationists shares the view that the existence of God could be deduced from the existence of intricate design that would be too complex to evolve by itself. To illustrate this idea some of them use the example of a cell, arguing that it is so "irreducibly complex" that it couldn't have evolved by itself and must have been created by a higher deity or intelligence with a purpose (e.g. Behe, 1996).

Critics of this approach see in this argument solely the resurgence of William Paley's (2003) argument from design using the analogy of the watch and the watchmaker, first published in 1802 (e.g. Pennock, 2001). The watchmaker argument was subsequently parodied by the scientific expert Richard Dawkins who gave one of his books on evolution the title *The Blind Watchmaker* (1986). Nonetheless, the visibility and influence of the *Intelligent Design* movement seems to be growing (e.g. Ruse, 2005; Numbers, 2006). Forrest and Gross (2004) report that the main organisation behind the movement, the Discovery Institute in Seattle, can draw on vast resources and that it also employs a variety of public relation advisors and communication experts who work to gain access to the mass media.

These various forms of creationism and creationist challenges to the theory of evolution are not confined to particular countries. It is now a global phenomenon (e.g. Coleman and Carlin, 2004a; Numbers, 2006; Kutschera, 2007). However, Christian forms of creationism are particularly widespread and influential in the US context, and less so in the United Kingdom (Coleman and Carlin, 2004b; Locke, 2004).

## *1.4. The theory of evolution*

Biological evolution explains how life on Earth emerged and developed. The theory of evolution is generally associated with Charles Robert Darwin (1809-1882). However, the history of science shows that new scientific explanations rarely came from a single individual. Therefore it is important to note that Darwin also had various "forerunners" that were proposing "evolutionary" developments, such as, for instance, Jean-Baptiste Lamarck (1744-1829) or Charles Darwin's grandfather Erasmus Darwin (1731-1802) (e.g. Bowler, 2003). Another name that needs to be mentioned in this regard is the one of Alfred Russel Wallace (1823-1913) who independently proposed a theory of evolution that is very

similar to Charles Darwin's and prompted Darwin to write up his ideas in the resulting book *On the Origin of Species by Means of Natural Selection*[3] (Darwin, 1979) which was published in November 1859. The first edition of this book was sold out the day it was published (Ellegård, 1990).

Charles Darwin's contribution in explaining how various species developed from a common ancestor was to describe the mechanism by which evolution takes place: natural selection. Environmental pressures, particularly the availability of food, act to select individuals of species that are better adapted than others. The better adapted ones survive and can pass on their traits to subsequent generations. Characteristics that are helpful in the struggle for survival will therefore be preserved and passed down whereas others that are not successful will die out together with the individuals that carry them. Since the environmental conditions of species change the population will also need to change and adapt to new conditions. Over long periods of time this leads to the formation of new species. This process also concerns the emergence of humankind and explains how human beings developed from common ancestors (Darwin, 2004; Wood, 2005).

One of the main sources of evidence for the theory of evolution is the continuity of the fossil record that documents various stages in the development of different species (e.g. Bowler, 2003).

This theory opposed the Christian church's view on the origin of human beings which saw humankind as the result of divine creation. Charles Darwin himself hardly quarrelled with representatives of the church but Thomas Henry Huxley, who was later nicknamed "Darwin's bulldog", advocated Darwin's theory in public, for instance in the infamous debate with Bishop Samuel Wilberforce in a meeting of the British Association for the Advancement of Science at Oxford in 1860 (e.g. Ellegård, 1990; Bowler, 2003).

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[3] All major works of Charles Robert Darwin are also available online at: http://darwin-online.org.uk/ (last checked 5 September 2007).

The debate about the theory of evolution and divine creation became one of the main areas of controversy between religious authorities and proponents of scientific thought and Darwin's theory of evolution provided the rationalists with a powerful weapon to attack religious explanations of the world (e.g. Russell, 1989). The historian of science Peter Bowler (1990: 82) notes:

"In the end the success of Darwinism rested not on the exploitation of the selection theory but on the exploitation of evolutionism by those who were determined to establish science as a new source of authority in western civilisation."

However, various scholars including Bowler (2003) argue that Darwin's theory of evolution was less of a shock to Victorian society than is commonly believed and that challenges to the idea of divine creation existed long before Darwin published his theory (e.g. Fleming and Goodall, 2002; Bowler and Morus, 2005).

One problem with Darwin's theory was that it could not explain how successful traits were passed on to subsequent generations. It was the plant breeding experiments of the Austrian monk Gregor Johann Mendel (1822-1884) that shed light on the processes of the inheritance of biological characteristics and led to the formulation of Mendel's laws, which have become a milestone in the development of modern genetics (e.g. Bowler and Morus, 2005).

Mendel worked out how units, which should later become known as genes, are transferred from one generation to the next. Later it was found out that mutations of genes provided the source of the random variation that were part of Darwin's theory as explanation why species change.

In 1937 Theodosius Dobzhansky (1982) published *Genetics and the Origin of Species* which brought the results of the study of molecular genetics and Darwin's theory of evolution together in what has been termed the neo-Darwinian or evolutionary synthesis

(e.g. Fuller, 1997; Mayr, 2002). This synthesis combines Darwin's mechanism of natural selection with Mendelian genetics and closes the gaps in Darwin's theory through the discovery of genetic mutations and explanations for the passing on and recombination of genes from generation to generation. Mayr (2004: 46) summarises this development:

"Darwinian theory was not a single theory, as Darwin always insisted, but was actually composed of five quite independent theories. Two of these were readily accepted by Darwinians: the simple fact of evolution (the "non-constancy of species" as Darwin called it) and the branching theory of common descent. The other three – gradual evolution, the multiplication of species, and natural selection – were accepted by only a minority of Darwin's followers. Indeed, these three theories were not universally accepted until the so-called Evolutionary Synthesis of the 1940s." (Mayr, 2004: 46)

The combination of evidence from various scientific fields further validated the theory of evolution. For instance, new methods of determining the age of the Earth further added evidence to the idea that the planet Earth is billions of years old and also to the theory that different species gradually evolved from common ancestors. The theory of evolution is now the consensus view of the most biological and Earth scientists on the biological origins of life on Earth (e.g. Scott, 2005). The theory of evolution has become the unifying theory in biology (e.g. Dobzhansky, 1973). However, for many scientists, such as the evolutionary biologist Ernst Mayr (2002), the theory of evolution is more than just a theory and the evidence accumulated in various disciplines leads them to think of evolution as a scientific fact:

"Evolution is not merely an idea, a theory, or a concept, but is the name of a process in nature, the occurrence of which can be documented by mountains of evidence that nobody has been able to refute. [...] It is now actually misleading to refer to evolution as a theory, considering the massive evidence that has been discovered over the last 140 years documenting its existence. Evolution is no longer a theory, it is simply a fact." (Mayr, 2002: 275)

However, evolutionary biology is still an enormous research programme and even though evolutionary biologists agree on the fact of evolution there are still many technical questions to be answered and still gaps in the fossil record that need to be filled in order to be complete. Reiss (2000) therefore notes that the evidence for the theory of evolution is less strong than in other scientific theories that can be supported by experiments in the laboratory. Evolutionary biologists also disagree about some details of how precisely evolution takes place, for instance, exemplified in the debates between Stephen Jay Gould and Richard Dawkins about the role of genes and the influence of the environment (Brown, 1999; Sterelny, 2001; Kingsland, 2003).

Also the term Darwinism has had different meanings at different times and has been referred to different concepts (also with strong political connotations such as in "social Darwinism", the idea that Darwin's theory can be applied to the social realm). While the theory of evolution proposed by Charles Darwin explained biological processes of survival and extinction and the diversity of species, evolutionary psychology now attempts to also explain the behaviour of humans beings (e.g. Young, 2002) and cultural phenomena such as religion (e.g. Dennett, 2006). Critics therefore see the danger that some "fundamentalist" adherents of evolutionary thinking claim to explain more than the theory of evolution is able to explain and therefore erode the boundaries of the natural sciences in order to explain social, historical and cultural phenomena (e.g. Rose and Rose, 2001; Davies, 2002). Turney (2001), for instance, detects that evolution has become something like an epic in popular science books. Ruse (2005) and Midgely (2002) consider that for some scientists evolution(ism) has become a secular religion (indeed Ruse (2005) argues that it makes more sense to understand "the evolution-creation struggle" as a conflict between two religions instead of a clash between science and religion). Moreover, Nelkin (2004) points out that especially in the biological sciences there is an occasional blurring of the boundaries between science and religion when scientists make use of religious

metaphors and language and portray themselves, for instance in genetics, as the high priests over "the book (or code) of life".

These statements refer to the debate about *scientism*, the belief that the natural sciences have authority over all interpretations of life. This issue is also particularly relevant in the debate about creationism and evolution (e.g. Pigliucci, 2002; Scott, 2005). However, the theory of evolution as proposed by Darwin and the conduct of the natural sciences operate under the rule of *methodological naturalism*, i.e. natural phenomena need to be explained through natural causes. What is very relevant for the controversy about evolution and creationism is that some scientific experts adopt the position of *philosophical naturalism,* the view that there is no God (e.g. Pigliucci, 2002; Scott, 2005). Some atheist scientists, such as Richard Dawkins, therefore come to the conclusion that science proves that there is no God(s), that science and religion are incompatible and that the theory of evolution is atheist in character (e.g. McGrath, 2004; 2005; 2007). Hence, in this view religion has no place in the teaching of science.

However, this is not the view of all professional scientific experts. As mentioned before, there are professional scientists that are believers and do research on evolution that is accepted and valued in the scientific community. Statements about the theory of evolution being atheist cause problems especially in the US context where religion may not be taught in public education. The theory of evolution is therefore under threat of being taken off the curriculum since some scientific experts treat it as a world view rather than a scientific theory (e.g. see Uhling et al., 2001, September 7; Bunting, 2006, March 27).

Ruse (2005) argues that evolution turned from pseudoscience to popular science with the publication of Darwin's theory of evolution and particularly through the promotion work of Thomas Huxley. Around the same time science started to become professionalized with the establishment of formal training courses and degrees. For example, students of a newly established science degree at Oxford and Cambridge University were taught the theory of evolution by 1865 (Ruse, 2005). But also the promotion of the theory of evolution in

natural history museums (often with displays of the fossil record and more spectacular reconstructions of dinosaurs) played an important role in publicising evolution in Britain and the United States (Ruse, 2005). However, it took until the evolutionary synthesis reached in the 1940s was widely accepted for research on evolution to become a professionalized scientific enterprise. Once the consensus was reached the expertise of professional evolutionary biologists and other evolutionary scientists could be promoted and the relevant professional scientific experts could start the "boundary work" (Gieryn, 1983; 1995; 1999) around the theory of evolution and its epistemological status.

Haskell (1984) notes the professionalisation of evolutionary biology was successful and that it is now the trust in the authority of professional biological scientists that is the reason for most (non-fundamentalist) citizens believing in evolution. Haskell (1984) argues that most people accept the theory of evolution as a valid explanation for the origins of life not because they checked the fossil record and other evidence themselves but because they rely on the expertise of the professional biologists working on the topic. This trust in the relevant scientific experts also depends on the continuation of a strong consensus about evolution among them.

## *1.5. Creation vs. evolution*

Historians note that there have been debates about what science and religion can and cannot explain long before Darwin (e.g. Bowler and Morus, 2005) with Galileo Galilei being one of the most well-known examples. Fundamentalist creationism however is more a phenomenon of the twentieth century than of the nineteenth century (Alexander, 2001; Numbers, 2006). For example, the theory of evolution was publicly challenged in the 1920s. This challenge coincided with the emergence of the Fundamentalist Movement in American Protestantism (Numbers, 1982; 2006). One event that was particularly important

for the public perception of the debate around creationism was the infamous Scopes Trial[4] in Dayton, Tennessee that took place in 1925. In this trial the local science teacher John T. Scopes took up the challenge of testing a new law (the Butler Act) that prohibited the teaching of any theory that denies the Biblical creation myth for the American Civil Liberties Union (Larson, 1997). Scopes was accused of teaching evolution and "the trial of the century" became the first to be covered not only in American newspapers, but also broadcast to be live nationwide on the radio.

The involvement of two well known high-profile lawyers, William Jennings Bryan for the prosecution and Clarence Darrow for the defence, highlighted the importance of the case and increased the public interest. Scopes was convicted of having taught evolution. The judge had assigned a 100 dollar fine but the Tennessee Supreme Court later reversed the conviction on a technicality (e.g. Larson, 1997; Numbers, 2006). Witham (2002) and McCune (2003) state that this heavily publicised trial provided a media template (see Kitzinger, 2000) for how all further US trials about the theory of evolution and creationism were and still are covered in the media.

Later on a play with the title *Inherit the Wind*[5] was written by Jerome Lawrence and Robert E. Lee, based on the trial that opened on Broadway at the National Theatre on 21 April 1955 and has been made into a Hollywood film with the same title in 1960, directed by Stanley Kramer and staring Spencer Tracy and Gene Kelly. George Schaefer produced a television movie version of *Inherit the Wind* in 1965.

Due to the federal governance structure of the USA the public education system of the United States is of a very regionalised and localized nature and the different states have varying regulations concerning what must be taught in science education. In various states

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[4] Transcripts and further materials of the trial are available online on the web pages of the University of Missouri-Kansas City School of Law: http://www.law.umkc.edu/faculty/projects/ftrials/scopes/scopes.htm (last checked 5 Septemer 2007).

[5] The American Studies Department of the University of Virginia offers a detailed history of all adaptations of *Inherit the Wind* here: http://xroads.virginia.edu/~UG97/inherit/contents.html (last checked 5 September 2007).

the teaching of evolution was and continues to be challenged[6] and various court cases were fought by creationists in order to "teach the controversy" (the fight for equal time for both accounts) in science education; that is, they campaigned for the inclusion of creationist theories in science classes (e.g. Nelkin, 2000a; 2000b).

Too much has been written on the various cases and the controversy itself to be mentioned in this introduction. Suffice it to say that the debate around creationism and the theory of evolution is still a live issue in the US context generating websites, theatre plays, movies, cartoons and comic books, songs, and other artwork. Even digital games concerning the controversy can be found.

Creationists in the US and also worldwide seem to focus on challenging the teaching of evolution as their main cause. For many of them evolution has become something like a metaphor for an immoral materialist worldview held by the professional scientific community and other (atheist) opponents (e.g. Toumey, 1994; Numbers, 2006). As mentioned before various groups of creationists have different viewpoints on science and the theory of evolution. Some creationists explicitly present themselves as scientific experts to use the authority of science to pursue intellectual, political, or religious agendas that do not coincide with the agendas pursued by the professional scientific community (Gieryn et al., 1985). Other creationists pursue different strategies and try to frame the discussion in religious or moral terms (Toumey, 1994; Numbers, 2006). Some scientists react by confronting and ridiculing creationists in public. However, this strategy can also backfire and give creationists and their views additional visibility and presence in the public sphere (Numbers, 2004).

Furthermore, the debate around the origins of life does not only concern biology but it also concerns issues like dating methods and the age of the Earth and other scientific disciplines including astronomy, geology, biochemistry, and anthropology (e.g. Scott, 2005).

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[6] For up to date information on the situation of teaching evolution in the various US states see the pages of the US National Center for Science Education: http://www.natcenscied.org/ (last checked 5 September 2007).

Some work has been done about how creationists and debates around creationism and the theory of evolution were reported in the media (Taylor and Condit, 1988; McCune, 2003; Mooney and Nisbet, 2005; Martin et al., 2006; Rosenhouse and Branch, 2006) but all of these works refer to the debate around creationism and evolution in the US context and not on how the creationism and evolution issue has been represented in the UK media or the media in other countries (see Toumey, 2004).

The debate around creationism and the theory of evolution is a debate in which the epistemological status of science is (sometimes) challenged by religious ways of understanding the world. Key to these debates is the question whether scientific or traditional religious accounts are more valid, relevant and meaningful to the disputants and also whether the different accounts can co-exist. Debates about creationism and evolution were in previous years played out in various public arenas; in education (particularly science education), the mass media and especially in the US context also in courtrooms.

## *1.6. The situation in Britain*

Within the United Kingdom, England and Wales share a National Curriculum that was first introduced in 1988 (e.g. Goodson, 1994). Science is a compulsory core subject in the education system in England and Wales until children are 16 years of age (Key Stages 1, 2, 3 and 4). There are given attainment targets for each of these key stages, at the end of which students are tested to assess their progression (Moon, 2001). The science curriculum is divided into four different topics:

- Science 1 - Scientific enquiry
- Science 2 - Life processes and living things
- Science 3 - Materials and their properties
- Science 4 - Physical processes

A major aim of Science 1 is the development of children's investigative skills, i.e. learning about scientific enquiry and the nature of evidence. The other stages focus more on the content of scientific disciplines, defined as biology, chemistry and physics. At Key Stage 4 (ages 14–16) in Science 2 "Life processes and living things", students have to study the theory of evolution and the fossil record as evidence for evolution and how variation and selection may lead to evolution or extinction of species. Until recently the curriculum also stated that students should learn about how controversies can arise throughout scientific practice. The National Curriculum - Science described this in the following way:

> "(1) Pupils should be taught:
>
> (b) how scientific controversies can arise from different ways of interpreting empirical evidence [for example, Darwin's theory of evolution]." (DfEE, 1999)

The fact that Darwin's theory of evolution was explicitly mentioned in the National Curriculum as an example of a scientific controversy had important consequences for the course of the debate that is examined in this thesis, notably in terms of which controversies could or should be taught in school science classrooms (see also Allgaier and Holliman, 2006).

In the UK context the theory of evolution was never under threat of being taken off the curriculum. Religious perspectives on creation are taught in religious education, which must be taught in England and Wales, but are not subject to statutory programmes of study. Parents also have the right to withdraw their child from all or part of the religious education classes (DfEE, 1999). Effectively, the National Curriculum determines what *has* to be taught. However, in practice it is possible that religious and other views are taught alongside the compulsory content of the science curriculum.

## *1.7. Research Questions*

The following research questions were set up to carry out further investigations and examine media content and media production of the controversy around Emmanuel College in UK newspapers.

Research questions concerning the debate in UK newspapers:

1. When and where were articles concerning the controversy around teaching the theory of evolution and creationism in science classrooms published?

2. What types of articles were published concerning the controversy around teaching the theory of evolution and creationism?

3. Was the debate around Emmanuel College a single controversy or were there various controversial issues involved in the debate? If so, what were the issues of the controversy in articles included in the sample?

Research questions concerning the role of expert sources:

4. How many and what kinds of expert sources were quoted in articles about the controversy around teaching the theory of evolution and creationism?

5. What did the quoted expert sources say concerning the debate?

6. How were the expert sources described in the articles?

7. Can connections between expert sources quoted in articles referring to the controversy around teaching the theory of evolution and creationism be identified and (re)constructed from the newspaper coverage?

Research questions concerning media production:

8. What kinds of journalists reported the controversy?

9. How did journalists judge the newsworthiness of the story?

10. Did the area of specialism of the specialist correspondents affect the selection and representation of experts in the coverage and if so, how?

11. What can be learnt about journalistic practice from this case study?

12. Did promotional strategies of experts and institutions play a role in the coverage of the debate around Emmanuel College?

13. How can a study of production provide a useful perspective that further informs the study of newspaper content in particular about the selection and representation of experts?

## *1.8. Chapter outline*

This chapter has introduced relevant background information about various forms of creationism, the theory of evolution and the situation of teaching evolution in England and Wales. It also introduced the case study that the research in the thesis is about: the debate around Emmanuel College in Gateshead, North England. The chapter also defined the research questions addressed in the thesis.

The next chapter introduces theoretical perspectives on experts and expertise, science and society, science education and the media. It provides the theoretical backgrounds of the study, revisits the research questions in relation to theoretical debates and provides a rationale for the methodological design of the study.

Chapter 3 describes the methodology and methods that were used in this study. It introduces the sample of the newspaper and of the interviewed media professionals and explains how media content and media production were analysed using qualitative and quantitative approaches.

Chapter 4 presents the results of the qualitative and quantitative newspaper content analysis, introduces the various issues of the controversy and examines statements and descriptions of quoted experts. A final section investigates connections between the quoted experts.

Chapter 5 presents the findings of the investigation of media production through interviews with media professionals. It discusses the newsworthiness of the story, the selection of expert sources and whether professional practices of journalists had an influence on reporting the story of Emmanuel College. It will also investigate evidence of promotional strategies in the production of the reporting.

Chapter 6 summarises the outcomes of the study by reviewing the findings from Chapter 4 and 5. The conclusion chapter provides a conclusion to the thesis describing the

implications of the work, assessing strengths and limitations of the study and giving recommendations for further work.

# 2. Theoretical perspectives on science and society, science education and media production

This chapter presents a review of the literature on theoretical issues surrounding this thesis. More specifically, this chapter starts with some general perspectives how science is understood by sociologists, then focusing on current theoretical debates about expertise from a sociological perspective. It also investigates theoretical views on scientific and science-based controversies, the special role that expertise plays in controversy contexts and what can be learnt about science and society relationships by studying them. This chapter also reviews the literature on the purpose(s) of science education, scientific literacy and the teaching of controversies in science education. The last section of this chapter presents theoretical perspectives on media production, journalistic practice and science (education) in the media. The review of literature on media production and journalistic practice points out some gaps in the literature that are empirically addressed in this study. Furthermore, it will also provide the rationale for the empirical design of the research presented in this thesis.

## *2.1. Science and society*

The discipline of sociology studies social relationships between individuals (on the micro-level), organisations (on the meso-level) as well as societies as a whole (on the macro-level). But what do sociologists actually mean when they talk of societies? Jary and Jary (1999: 627) define society as "the totality of human relationships". Traditionally, societies have been equated with the nation-state, for instance it was not unusual to talk of "the British society". However, many social and cultural theorists have noted that the "global flows" of people, technologies and goods, money and media products have transcended the boundaries of the nation-state and that it is much more likely that we are now living in one

single all-encompassing world society (e.g. Robertson, 1992; Appadurai, 1996; Stichweh, 2000). These processes of globalisation have been made possible in part through innovations in science and technology, for instance through technologies for transport and information and communication technologies (e.g. Castells, 2000).

Society is the place where all social interactions take place and from a sociological point of view there is nothing that happens outside society (e.g. Stichweh, 2000). Next to the development of theorizing society in terms of globalisation processes another recent move in social theory was to reconsider human relationships in terms of material and non-human objects that surround humans all the time and influence the way they interact as well as their behaviour, actions and communications (e.g. Latour, 1993; 2000; 2005; Michael, 2006). Hence, the non-human are also part of society. This development has been subsumed under the headline of post-social developments in social theory and has led some theorists to describe society as post-social knowledge societies (e.g. Knorr Cetina, 1997). This diagnosis stems from the reflection that science and technology have become pervasive parts of contemporary society. For instance, Roberts and Mackenzie (2006: 162) note that "almost everyone eats, breathes, perceives, moves and sometimes thinks through science or its products". Current society is percolated and shaped by science and technology and science and technology and society mutually shape and condition each other (e.g. Michael, 2006). Weingart (2003) therefore describes the sociological study of science and technology also as a way of diagnosing society as a whole. These are good reasons why science education in schools should help the citizens of tomorrow to make sense of ongoing developments in science and technology and also why the media should have an interest in covering cutting-edge developments about science and technology.

Science and technology are made and "done" by humans, they are inevitably the products of human activities and the products influence how science is done (Pickering, 1995). From the point of view of many sociologists the outcomes of science and technology are therefore socially constructed (e.g. Latour and Woolgar, 1979; Collins and Pinch, 1993).

This means that the results of scientific activities do not speak for themselves but scientific and technological practitioners must determine and interpret what the outcomes of research mean. Saying that things and facts are socially constructed does not mean that they are "wrong" or "made up":

> "It is not that facts and things are *either* socially constructed *or* true and reliable, but that they are *both* socially constructed *and* true or reliable, or perhaps false or flawed, depending on the circumstances." (Bauchspies et al., 2006: 3, emphasis in original)

From a sociological point of view it is not only science and scientific knowledge that is socially constructed but also syllabi of the knowledge that has to be learnt in school such as the National Curriculum for Science (e.g. Hodson and Prophet, 1994) and media accounts of reality (e.g. Schudson, 2000). Science in this sense is not about discovering knowledge but seen as a collective activity of producing knowledge and both science education and media accounts represent this knowledge in particular ways.

One site for studying scientific and technological practitioners in action and how science and technology are made in practice are scientific research activities in laboratory settings (e.g. Knorr Cetina, 1981; 1995; 2003). Another site is the study of public controversies about science, such as the debate around creationism and the theory of evolution presented in this thesis. Here sociologists can study how scientists (and other forms of expertise) have to actively demarcate science from what is not science (Gieryn, 1983; 1995; 1999). Laboratory settings are highly artificial and simplified conditions that often cannot be directly compared to the complex conditions of the world outside the laboratory. Latour (1987) argues that the outcomes of scientific and technological research must be "purified" and cleared of the vagueness of human interpretations and the uncertainty of research to become objective scientific "facts". Latour (1987) coined the terms "science in the making" to distinguish knowledge that has not been validated from the cleared and tidied-up outcomes of science and technology that he calls "ready made science". Latour (1987)

also uses the term "technoscience" to refer to science and technology being intertwined in practice; technologies are often essential in the process of doing sciences and the outcomes of scientific work are often technologies (see also Michael, 2006). Following these arguments, the outcomes of scientific work are situated knowledge that is socially constructed, historically and culturally specific and generated by a certain group of people: the scientific community.

A central aspect of turning "science in the making" into "ready made science" is the communication of scientific results and hypotheses through publication in peer reviewed academic journals, also presentation at academic conferences to other specialists of the academic subject (e.g. Sutton, 1998).

Scientific theories are established prior to review. In theory, peer review by specialists of the concerning field(s) discuss the results or the theory in relation to other theories available on the basis of the evidence provided and a theory is seen as being valid once the specialists of the relevant scientific disciplines reach a consensus. A shift from "science in the making" to "ready made science" (Latour, 1987), tacit though it may sometimes be, acknowledges the formation of some form of consensus that the knowledge is valid and reliable.

Once a scientific "fact" or theory reaches the status of being the consensus view among the specialists of the discipline the theory is seen as the best scientific explanation that is available at the time for a natural phenomenon. However, this implies that scientific knowledge is preliminary and the best available knowledge at the moment and better explanations and theories might be found in the future (Latour, 1987). Once a theory is accepted it becomes part of the canon of knowledge to be defended. This is achieved through the strategic actions that Gieryn (1983; 1995; 1999) terms the boundary work of science.

Not all new results and ideas are controversial among scientific specialists. As it was shown in the introductory chapter the specifics of the theory of evolution by natural

selection might have been controversial among scientific experts when it was first published, but after decades of accumulating and synthesising evidence from various disciplines it reached the status of being "ready made science", i.e. it is accepted by the specialists of the disciplines of biology and other disciplines as a valid explanation for the origins of life that is backed by fossil evidence, research in genetics and other forms of scientific evidence and is now the consensus view of the scientific community on human origins (e.g. Scott, 2005).

As will be shown later the distinction of new "science in the making" and established "ready made science" is especially relevant for scientific controversies. For example, in science classrooms and media accounts there is also a discussion about whether only "ready made science" i.e. the "objective" scientific facts and established theories should be taught or if school children can benefit from the encounter with new and controversial science, i.e. "science in the making". This will be further explored in Section 2.2. of this chapter. Furthermore, science that is covered by the mass media is also often new and often controversial (e.g. Nelkin, 1995). How the media deal with science will be further examined in Section 2.3. of this chapter.

### 2.1.1. Scientific experts and society

The boundaries between science and society are not natural ones but the outcome of social negotiations which are historically contingent. Scientists need to actively demarcate science from other areas in a constant process of "boundary-work" in order to determine what counts as being scientific and what does not and who counts as a scientific expert and who does not (Gieryn, 1983; 1995; 1999). The scientific community is a social group consisting of professional scientific experts (e.g. Alexander, 2005). Following traditional accounts of expertise a scientific expert is a formally trained specialist in a scientific discipline (Larson, 1984). However, recent ideas challenge simple definitions of expertise

and argue that in reality the boundaries between experts and non-experts are often blurred (e.g. Kelly, 1998; Leadbeater and Miller, 2004 – see the following sections).

Access to the scientific community is granted through an enculturation process into the professional culture of the scientists that involves specialised education and acceptance of professional norms (e.g. Ziman 1978; Delamont and Atkinson, 2001; Roth and Bowen, 2001; Campell, 2003). Woodward and Watt (2004) argue that science today is still learnt through a traditional apprenticeship system. Merton (1973) identified five norms (commonly referred to by the acronym CUDOS) that have to be accepted by the members of the scientific community:

1. Communalism (scientific knowledge is property of the scientific community rather that of individual scientists)
2. Universalism (impartial assessment of scientific claims)
3. Disinterestedness (scientists should not have emotional or financial attachments to their work)
4. Originality (novelty in research contributions)
5. Scepticism (rigorous checking of scientific work)

However, Ziman (1996) and others (e.g. Latour, 1998) question whether these norms still apply in "post-academic" science, where scientists are often liable to private institutions that provide the funding for their research.

Historically the term scientist first appeared in the nineteenth century. Bowler and Morus (2005) note that it was introduced by the philosopher and scientist William Whewell in 1837. Before that scientists were called natural philosophers (e.g. Alexander, 2001). Fuller (1997) sees the priesthood as the model on which this social group developed through training and commitment (see also Kuhn, 1970; Fleck, 1979; Campell, 2003). In the following decades scientists have become very successful in establishing themselves as

authorities of knowledge about the natural world and the specialism(s) of scientists increased. For instance, Haskell (1984) argues professional biologists now speak with authority about the processes and origins of life. The current biological sciences cover a range of specialisms and scientific experts of various disciplines also cooperate in interdisciplinary research collaborations. However, in controversy contexts the authority of scientific experts is challenged by non-scientists.

The scientific community developed through professionalisation and formal training and established a professional ideology (see Becker and Carper, 1956; Layton, 1976) in which they portray themselves as value-free, neutral and objective experts (Proctor, 1991; Weber, 1995). From a sociological point of view scientists cannot operate outside society, they are as much members of the public as anyone else. The knowledge of scientists is based on certain routines, norms, conventions and standardized methods but their knowledge is also situated in certain social, cultural and historical contexts (Haraway, 1991) and the notion that a scientific expert can be entirely neutral, value-free and objective cannot be sustained from a sociological perspective. (Revisto, 1994; Bauchspies et al., 2006).

Furthermore, science consists of a plethora of various disciplines and areas of specialisms that involve different methods, knowledge and objects. In other words science has become a highly complex subsystem of society that operates along particular codes of communication that are different from those of other parts of society (Luhmann, 1992; Weingart, 2005). It is unlikely that one scientist, say an organic chemist, knows enough about all other scientific disciplines that he or she can call himself or herself an expert in science (see Fuller, 1997). Specialisation in this regard also means a limitation of expertise in science more generally.

2.1.1.a. The ideal of the scientist

Petkova and Boyadejieva (1994) argue that the scientific community deliberately promoted an idealized image of scientists being objective, rational and emotionally neutral bearers of truth. This idealized image of scientists served not only for recruitment purposes in making science attractive for new generations (e.g. Hodgson, 2006), but it also had the function of ascribing a positive social identification to the individual members of the scientific community. Thereby it could preserve itself as an entity and foster the integrity of its members.

A second group of functions of the idealized image of scientists is related to the regulation of relationships between the scientific community and other social communities. The promotion of an idealized image of scientists justified their claims for autonomy and preserved their distance from other social groups (Petkova and Boyadejieva, 1994; Gieryn, 1999).

More recently the epistemological superiority of scientific experts has also been challenged by other experts and professionals. For instance, homeopathic, alternative and traditional medical practitioners attack the effectiveness and credibility of modern biomedicine (Woodward and Watt, 2004) and religious and other experts attacked and still attack the credibility of evolutionary biologists as well as the validity of the theory of evolution in the debate about the origins of life (e.g. Scott, 2005; Numbers, 2006). It has been argued that in the contemporary era the general public is more aware of disputes between experts because of the coverage of schisms between experts and authorities through the mass media. Goldblatt (2004b: 150) argues:

"Debates that were once confined to a small circle of influential figures and institutions within each of these traditions are now amplified through the enormously expanded means of communication that now exist. The media, in all its forms, has become less deferential in investigating such schism, and more skilled and persistent in identifying and popularizing these debates. As a consequence, the general public has been

exposed to the epistemological uncertainty that elite and expert knowledge and culture have always possessed but rarely revealed."

### 2.1.1.b. Scientific expertise and risk

Scientific expertise also plays a key role in the work of Beck (1992). Beck characterises society and new social inequalities along with the categories of globalised environmental, technological and scientific risks and hazards that undermine other sociological categories of social stratification, such as class. He argues that the risk of transnational catastrophes such as the consequences of the radiation accident of the Chernobyl nuclear power plant threatens people independently of their social status and does not stop at the borders of nation states. In Beck's analysis, citizens are highly dependent on scientific and technological experts to assess, calculate, measure and predict the potential risks and benefits of the implementation of new technologies or particular scientific, technological, medical or environmental policies. However, Beck argues that citizens are at the same time very suspicious about the (scientific) experts since many of the new risks, hazards and dangers that the citizens fear have their origin in scientific and technological practices. Key issues in Beck's work are the uncertainty that is part of science and the unintended side effects that accompany innovations in science and technology. These lead to a highly ambivalent relationship between scientific expertise and citizens where the erosion of trust in scientific experts goes hand in hand with a feeling of being at the experts' mercy concerning the assessment whether new and complex developments in science and technology might be harmful, beneficial or both. In this scenario not only citizens but also the political system is dependent on expert knowledge and the resulting politics of expertise and counter expertise.

Also in the debate around creationism and the theory of evolution experts and different forms of expertise clash and similar arguments are brought forward, for instance, when

creationists claim that scientists have created an exclusive elite system that cannot be controlled by the general public without the necessary scientific credentials, which are awarded only by the scientific community (see Chapter 4).

Another issue in this debate is that sometimes experts speak out on issues that do not fall into their actual area of expertise. Taylor (1992) observed that in the debate whether religious accounts should be taught in science education in the US context scientists often spoke about what would be best for public education without having any actual expertise concerning the system of public education. In order to investigate the issue of expertise further this thesis investigates the question which kinds of expert sources were quoted in newspaper coverage of the creationism controversy and what kinds of arguments the expert sources brought forward (see Chapter 4).

### 2.1.1.c. Scientific expertise and the public understanding of science

In the 1980s there was dissatisfaction among the scientific community with how "the public" perceived science. A number of mainly quantitative surveys determined also that "the public" was not scientifically literate enough to make informed decisions involving science (e.g. Irwin and Michael, 2003). Various efforts have been made to "enlighten" the public about science and increase and foster a better "public understanding of science". As a consequence a range of promotional strategies and initiatives were established to disseminate scientific knowledge and to educate the public about science (Dickson, 2000; Miller, 2001; Bauer et al., 2007). The assumption behind these initiatives was that a public that was more educated about science would take up more science and also better appreciate the value of science (Ziman, 1991; Thomas, 1997). The same strategy was also adopted as the answer to the challenge of creationism in the US context: many scientists assumed that the better the public would be educated and the more they would know about evolution, the more they would appreciate the value of and evidence for the theory.

However, commentators note that hardly any successful initiatives can be found that achieved this goal on a large scale (Taylor, 1992; Nelkin, 2000b; Bleckman, 2006).

In this view there is a divide between educated scientific experts and an ill-educated public that is "ignorant" about science and needs to be educated by the experts. This asymmetric and simplified model of science and society relations that described the public as being deficient in scientific knowledge had soon come under attack and was labelled the "deficit model" of science communication by a range of critics (e.g. Wynne, 1991; Sturgis and Allum, 2004; Trench, 2006). Furthermore, this model did not problematise the heterogeneity of "the public", which is in fact better understood as various publics of science (with a range of situated expertise) (Silverstone, 1991; Irwin, 1995).

Wynne (1991) was one of the first to challenge the "deficit model" of science communication. He found in a study about scientific expert advice about radiation hazards to sheep farmers in Cumbria that the practical knowledge of the sheep farmers was an important aspect in understanding the practical consequences of dealing with the radiation risks (Wynne, 2003a). However, the scientific experts failed to recognize the value of the farmers' expertise about the highly specialist and particular practices of hill-farming of sheep. The expertise of the sheep farmers was passed down orally from one generation to the next and was not formally certified. The scientists therefore considered them as a non-expert audience that had nothing to contribute to the case and that needed to be advised about the scientific facts of radiation. The ignorance of the sheep farmers' expertise by the scientists resulted in the loss of credibility of the scientists because the scientists could not give the sheep farmers advice that matched their own experience in how to deal with the sheep on the hills (Wynne, 2003a). Wynne concludes from this study that in this case the sheep farmers showed themselves to have more *relevant* expertise than the scientific experts.

Other sociologists have also challenged the idea of an ignorant and non-reflexive lay public that is opposed to reflective scientific experts. For instance, Michael (2003)

conducted a study in which he analysed "discourses of ignorance" of science among members of the public. He found that the interviewed participants of the study were highly reflective about their negligence of uptake of scientific knowledge. For instance, some referred to their mental constitution ("non-scientific mind") and others to the division of labour ("not my job") in order to explain why they lack knowledge about science. Others clearly stated their lack of interest in science as a deliberate choice. The results of this study point to the reflexivity of citizens about their uptake or negligence of science. It further illustrates that the way the homogenised "public" is characterized as being ignorant about science also had to do with the research methods that were used to measure their ignorance.

Where a closed multiple-choice questionnaire had revealed that a large proportion of the participants ticked the "don't know" box in a question about scientific knowledge the use of qualitative methods could investigate *why* they ticked the "don't know" box, what they thought about science and scientific knowledge and under what circumstances they saw scientific knowledge and expert advice being relevant to their own lives. The use of certain methodologies therefore lead to particular ways of (re)constructing "the public" and their knowledge (Irwin and Wynne, 2003; Irwin and Michael, 2003; Holliman, 2005).

The overall conclusion from this kind of research is that it is not the members of the public that are ignorant and non-reflexive about science, rather it is the way "the public" and their knowledge concerning science was (re)constructed by the scientific community that is "ignorant" to what the members of the public actually think and know about science (Layton et al., 1993; Wynne, 1995). The end result is a broadening and blurring of the concept of expertise and also a better understanding of the value and relevance of the situated expertise of citizens.

Further work on the divide of expert and lay knowledge explored the uptake of lay knowledge by the scientific community (Wynne, 1996). One result of this work is that lay knowledge usefully contributes to and can become an integral part of scientific knowledge.

However, it must be "purified" by certified scientific experts so that it can enter the scientific realm and become certified scientific knowledge (e.g. Schwenke, 2005; Michael, 2006). The discussion about how the "situated expertise" of citizen experts (e.g. Irwin, 2001) can contribute to scientific knowledge and be made use of is also closely related to the question on a global scale how "indigenous knowledge" can be preserved and usefully contribute to theoretical, formal and certified knowledge (Swift, 1992; Snively and Corsiglia, 2001; Leach and Scoones, 2005; Gupta, 2007).

The debate around the theory of evolution and religious accounts of the origins of life has in a similar manner been described as a conflict between science and traditional knowledge in a Western context as well as a conflict between Western science and indigenous knowledge in Non-Western cultures (e.g. Layton, 2004). Furthermore, the debate around creationism raises the question whether scientific experts can take up and value the viewpoints, experiences and concerns of, for instance, religious experts, pupils and parents (e.g. of cultural minority backgrounds) and contribute to a solution that is satisfactory for all involved actors or whether the scientific experts' statements solely point to the lay status of other actors when it comes to scientific aspects of the debate (e.g. Burchell, 2007).

### 2.1.1.d. Scientific citizens and citizen science

Irwin (1995) developed the concept of "citizen science" to investigate the relationships between science and society not from the view of the scientific community but from the point of view of the citizens that are affected by the developments of science and technology. Irwin suggests that the citizens affected by particular scientific and technological developments should not only be seen as passive audience and he investigates ways how the situated and local experience of the citizens could be incorporated into the working processes and practices of scientific and technological

experts to the benefit of both, citizens and scientific experts. Irwin argues that the relevance that the outcomes of scientific research have for the everyday life of citizens must be taken into account, especially if these outcomes will affect them (see also Fischer, 2003). This way of thinking has also strongly influenced recent developments and approaches in formal science education and recent changes in the science curriculum for England and Wales (e.g. Jenkins, 1997; 1999; Millar, 1997; Fensham, 2000; Roth and Barton, 2004; Burden, 2005; Allgaier, 2007b).

### 2.1.1.e. Interactional and contributory expertise

Referring to the discussions about lay and expert knowledge Collins and Evans (2002) suggest a new branch of study that is concerned with the investigation of experience and expertise. This involves the development of a normative theory of expertise that investigates expertise and the political rights of members of the public to contribute in technical decision-making processes. Collins and Evans (2002: 254) offer a new analytical distinction of expertise: *interactional expertise* and *contributory expertise*. Whereas *interactional expertise* determines whether actors are able to "interact interestingly" with the experts *contributory expertise* is based on personal experience and determines whether actors have enough expertise to contribute to the science of the field being analysed. One might assume that interactional expertise is a prerequisite for contributory expertise but Collins and Evans argue that this is not necessarily the case.

Revisiting Wynne's (1996; 2003a) study of the sheep farmers in Cumbria they explain that the sheep farmers had the necessary contributory expertise based on their personal experiences to contribute to the relevant science but lacked the interactional expertise to engage meaningfully with the scientific experts. Since the scientific experts in this case also seemed to lack interactional expertise the encounter between the expertise of the scientists and the expertise of the sheep farmers did not yield solutions to the problem that

were satisfactory to either group. Both scientific experts and sheep farmers are treated symmetrically as specialists in this approach and one of the aims of this approach is to distinguish between ubiquitous and specialist knowledge that has been gathered as a result of local experience. In this sense the interaction of scientific experts and the sheep farmers is the interaction between two communities of specialised experts, but only one is officially certified as expert community.

However, Collins and Evans aspire the development of a normative theory of expertise and decision-making on this basis that is able to decide whether actors should be allowed to contribute legitimately in technical decision-making based on their expertise and experience (see also Collins, 2007). They think this is important because otherwise "the public" as a whole is attributed with some sort of expertise, which would make participation based on expertise in decision-making processes futile. Boyce (2006) thinks that these normative guidelines for expertise should also be adopted by journalists in their selection of expert sources.

Collins and Evans' contribution has caused fierce criticism (e.g. Rip, 2003; Jasanoff, 2003; Wynne, 2003b – see also Collins and Evans (2003) for a response). For instance, Jasanoff (2003) and Wynne (2003b) claim that Collins and Evans deliberately exclude certain worldviews from participation and neglect the broader negotiation of public meanings and identities.

With this discussion in mind the case study described in this thesis examines which types of experts and worldviews were represented and which voices were heard in newspaper coverage about a controversy around what should be taught in science education. However, the analysis presented in this thesis cannot illuminate which are "legitimate" experts in this controversy per se. But it sheds light on the selection processes of various journalists and specialist correspondents that reported the controversy and who they considered as relevant and credible expert sources in this debate.

### 2.1.1.f. Citizens and experts: ethno-epistemic assemblages

Irwin and Michael (2003) pursue a more collective approach in investigating the interface of science and society. After reviewing several case studies they suggest that in practice there is less a contrast between expert and lay actors in issues concerning science and citizens but that it is rather coalitions or assemblages of various actors that emerge and face each other. Here they draw specifically on the work of Deleuze and Guattari (2004) on assemblages. Assemblage is an anti-structural concept that stresses emergence, heterogeneity and the decentred-ness of the order of social life (Marcus and Saka, 2006). In scientific and technological issues that concern various actors one finds different coalitions that bring together laypeople and experts in the same group. These assemblages can entail expert practitioners such as communication or publicity experts but also experts with knowledge from different areas such as political, scientific, religious expertise and local, experiential and other types of knowledge.

Irwin and Michael (2003) argue that in practice it is such assemblages which are in conflict rather than experts and laypeople or science and society per se. These assemblages battle with one another for legitimacy and credibility in the wider public and also often try to gain influence on decision-making processes and use the media to so.

Irwin and Michael (2003) propose the notion of *ethno-epistemic assemblages* as a heuristic tool with which heterogeneous groupings could be analysed. "Epistemic" here refers to the production of truth or truth claims; "ethno" connotes the idea of locality and situated-ness of knowledge; and the concept of "assemblage" is used to grasp interweavings of lays and experts (Irwin and Michael, 2003: 119-120). These assemblages are not static, they are dynamic and processual and different actors with various knowledges, expertise and experience can join these groups but also leave and abandon them if they are not successful. This concept is proposed for a better understanding of the way how controversy, debate and negotiation are played out in public. Instead of struggles

conducted between experts and (lay) publics, Irwin and Michael propose that struggles over truth claims are conducted between assemblages made up of different combinations of experts and publics. The concept of ethno-epistemic assemblages therefore blurs the boundaries between experts and non-experts but also between public, government and governance as well as between science and society per se (see also Michael, 2006).

An example of an ethno-epistemic assemblage and its "struggle for credibility" is the early movement of AIDS activists described by Epstein (1995; 1996 – for a further example see Allen, 2003). Initially the movement of AIDS activists formed to represent the voices of people infected or diagnosed with HIV/AIDS in the West[7]. Later the movement became so successful and credible that even medical and scientific experts took their "lay expertise" seriously and accepted and valued their input into research matters.

Epstein (1995; 1996) considers credibility as a system of authority that combines power, dependence, legitimation, trust and persuasion. But how did the heterogeneous movement of AIDS activists achieve such a high degree of credibility? Epstein (1995) describes four "credibility tactics" that were employed in the movement's struggle for credibility:

- The activists learned the language and culture of the science relevant to their case.
- The movement successfully established itself as the voice of people with HIV/AIDS (Validity through suffering from the infection).
- The activists successfully yoked methodological (or epistemological) and moral (or political) issues together to monopolize different forms of credibility in different domains.
- The movement took sides in debates that existed among experts before over how clinical research should be done. So, the activists have seized on pre-existing lines of cleavage among the experts.

[7] This example refers to the emergence of HIV/AIDS in the US context in the 1980s and not to the more recent pandemic in Sub-Saharan Africa.

The movement of AIDS activists (that started in the area of San Francisco) had the advantage that many of the members of gay communities were professionals and intellectuals themselves, which implied that they had social and cultural capital (Bourdieu, 1986). The group of activists itself consisted of a heterogeneous mass of people including many of the members of the gay community. This capacity was an important prerequisite for mastering the technicalities of the debate around treatment in a way that even the credentialed experts were impressed. The arguments that were used by the movement were not only technical ones, but they related them to epistemological, methodological, political and ethical claims – speaking as the voice of the concerned people. The activists also made effective use of the media in making their voice heard and were later accepted as alternative expert sources by media professionals (Miller et al., 1998). In this way the treatment activists had an impact on and got involved in the research and treatment processes of HIV/AIDS and their opinion was acknowledged and taken seriously by the established experts.

However, there is also an ironic twist: By moving closer to the language and culture of the established experts a fissure emerged within the movement of the activists. The activist leaders had become acknowledged experts themselves that successfully interacted with the scientific community. The new chasm has therefore been described as between "lay expert" activists and "lay lay" activists (Epstein 1995; 1996). This example illustrates that a group of non-experts can gain enough credibility to enjoy expert status among the established expert practitioners whose input into research and science is valuable, useful, welcomed and acknowledged and also count as expert sources for the media (and in doing so lose credibility among their peers). Through the lens of Collins and Evan's (2002) analytical distinction of expertise the movement of the AIDS activists was very successful because it managed to develop and combine both: *interactional expertise* and *contributory expertise*.

Investigating the question of which expert sources are represented in newspapers in the case study reported in this thesis involves investigating the question of whether connections and coalitions between experts can be identified and whether coalitions emerge only between similar types of expert sources or whether coalitions are more heterogeneous in character.

### 2.1.1.g. Experts and the governance of science

Giddens (2000) argues that many modern institutions strongly depend on citizens' trust in experts and expertise. The discussions around symmetry or asymmetry between experts, lay activists and citizens have also been reflected in terms of scientific governance (e.g. Bogner and Torgersen, 2005). Recent rhetoric concerning the interface between science and society do not use the (asymmetrical) label of "Public Understanding of Science" anymore; the new catchwords are "public dialogue" or "public engagement" *with* science. Here, the discussion is about how citizens can take part in decision-making processes about science and technology and contribute to science and technology themselves (e.g. Stilgoe et al., 2006). The term "scientific citizenship" refers to this set of problems as well as to questions of how the citizens deal with the micropolitics of using and being surrounded by products and the uncertainty of science and technology in their everyday life (e.g. Elam and Bertilsson, 2003; Felt, 2003; Stevenson, 2003; Michael, 2006). The discussion around scientific citizenship is also important for the discussion of the purposes of science education (see Section 2.2.), since some approaches tend to focus on the education of scientific experts and other approaches in science education focus on the relevance of science for the citizens of tomorrow.

However, a closer look reveals that the "deficit model" of science communication is still alive in many of the initiatives that claim to bring science and citizens closer together (Irwin, 2006; Trench, 2006).

## 2.1.2. Controversies about science

Because of the ongoing tension between "science in the making" and "ready made science" alongside the application of technoscience, studying controversies is another fruitful research area of sociologists of science (e.g. Latour, 1987; 2005; Collins and Pinch, 1993; Brante, 1993). Petersen and Markele (1989) regard the study of controversies as helpful devices for revealing the social and political nature of science. Giere (1987) states that in most of the cases more than just scientific questions and issues are involved, often seemingly scientific controversies also contain ethical or value issue as well as political and public policy issues.

Most scientific controversies are about "science in the making" that is still under discussion among the scientific specialists (Latour, 1987); knowledge that is new and often partial and uncertain. Here the communication of scientific experts about results or hypotheses among each other plays a key role in establishing consensus (or otherwise) among scientific peers. Central in this process are scientific conferences and publications in peer reviewed academic journals. Scientific consensus is based on the collective judgement and opinion of scientific specialists in a particular field at a particular time, but the scientific consensus is hardly manifest or measurable (e.g. Oreskes, 2004; Guston, 2006).

However, as mentioned earlier one of the norms of the scientific community identified by Merton (1973) is scepticism also towards established facts and theories. Popper's (1959) theoretical idea of falsifying hypotheses and theories works as a criterion of demarcating science from non-science. Theories and hypotheses that cannot be falsified through observations or experiment are not seen as being scientific and this norm also states that scientific results need to be tested and retested. Popper stressed that no hypothesis can ever be proved to be absolutely true. Therefore scientists should try to refute knowledge claims. There is therefore an ongoing tension between the acceptance of theories and evidence as

true until such time as they are refuted. However, in practice it is possible that scientific experts are rather trying to validate their hypotheses instead of trying to falsify them (e.g. Bowler and Morus, 2005).

The history of science shows that a theory can be accepted by the majority of the scientific community for decades without being exposed as false (e.g. Bowler and Morus, 2005). Scientists therefore value the idea that scientific theories should be challenged in order to ensure that they are correct. As consequence the scientific consensus is, at least theoretically, subject to change in the light of new results and observations and involves uncertainty (e.g. Chalmers, 2005). These norms are particularly relevant to this case study since some of the advocates for creationist theories referred to the norms of falsification and scepticism when they challenged the validity of the theory of evolution (see also Numbers, 1982; 2006). As will be shown in Chapter 4, as a result, some creationists claim to take the norms of science more seriously than the scientific community.

One of the difficulties of communicating scientific results to the public is that even the scientific consensus is preliminary and uncertain and can change in the future (e.g. Beck, 1992; Gregory and Miller, 1998). It is also not clear how the consensus manifests itself or what counts as an acceptable level of consensus. Although most controversies are about new scientific findings and their meaning, there may also be public or political debate on subjects that are controversial within the public sphere but which are not controversial within the climatological scientific community, such as, for instance, climate change (see Oreskes, 2004). The case study of a controversy about science (education) in the media presented in this thesis is atypical as it is about an established theory that is "ready made science" and is not a new hypothesis but the consensus view of the scientific community on the origins of life (e.g. Scott, 2005).

Engelhardt and Caplan (1987) state that controversies provide an interesting opportunity for examining how science secures its knowledge claims and how forces external to science are impeding this process. In their view a first important step in studying

controversies is to distinguish the issues hidden in what might appear to be a single homogenised controversy. The outcome of such an analysis is a "geography of controversies" that helps to map and identify which issues and actual debates derive from the controversy and to point out what the subsequent controversies are about. For this reason the research presented in this thesis asks the question if the controversy around teaching creationism and the theory of evolution is a single controversy or if it consists of various controversial issues and investigates which the interrelated controversial issues are. A second step is then to identify which experts and social groups are involved in debates about the set of interrelated controversies. Therefore further research questions in this thesis address which expert sources are represented in the newspaper coverage and if coalitions and connections between the involved expert sources can be identified.

In Engelhardt and Caplan's (1987) view controversies are subjected not only to external but also to internal political forces, for instance, there are also political and social forces internal to communities of scientists. Mendelsohn (1987) points to a similar idea when he states that in disputes over science and society distinctions between internal and external fade into the background and a much subtler picture between intellectual elements and social interests emerge. For instance, Gieryn et al. (1985) examined disputes between scientists and Biblical creationists in two court cases in the USA in order to analyse professional ideologies of science. The comparison of two different cases allowed them to investigate the boundary work employed by the scientists and to trace differences in the public presentation of ideologies of science at different times (see also Gieryn, 1983). Gieryn et al. (1985) concluded that the ideological flexibility of the scientists contributed to the successful professionalisation of scientists in the American society. The problem of the demarcation of science from other ways of thinking is addressed in this study through the examination of the statements of the scientific expert sources that are quoted in the newspaper coverage about the debate around teaching creationism and the theory of evolution. Here it is of interest if a common way of arguing can be identified and how

scientific experts try to (rhetorically) demarcate themselves from the claims and statements of other experts quoted in the sample.

### 2.1.2.a. Scientific and science-based controversies

Brante (1993) distinguishes *scientific controversies* and *science-based controversies.* Whereas the first concern contending knowledge claims where at least one of the involved parties has to have scientific status the second typically include scientific and social factors of various kinds that affect the framing and the outcome of the debate (see also McMullen, 1987). Brante argues that experts are primary actors in science-based disputes. He defines scientific experts as the major link of transmission between the knowledge-producing and the decision-making instances of society. Scientific experts move between the realms of scientific knowledge and political action. In so doing, they often utilise an idealized image of science to derive credibility and authority. This involves, for instance, a rendition of objectivity, disinterestedness and neutrality in public debates, as Hilgartner (2000) observes:

> "In the world of science advice, one of the central identity norms concerns the objectivity (in the sense of disinterestedness) with which advisory bodies approach their charge. Thus [...] advisors work hard to enact objectivity, sharply separating themselves from "vested interests" that might seek to influence their advice. Critics of advice, for their part, often attribute interests to the advisor, charging that the impression of objectivity is merely a mask. Much of the drama surrounding science advice consists of efforts to expose, disclaim, or disavow putative interests, as competing performers present conflicting assessments of the character of the advisor. Judgements about the credibility of advice thus cannot be separated from moral judgements about the people and institutions that produce it. When controversies flare, claims of expertise, integrity, and disinterestedness battle against accusations of incompetence, dishonesty, and bias, in a war of dramatic narratives, as competing performers fit events into stylized plots that allocate blame and suggest ways to restore social order." (Hilgartner, 2000: 14-15).

Various scholars agree that scientific expert advice becomes a major political resource in scientific or science-based controversies that is often played out in media reporting (e.g. Nelkin 1984, 1987; Peters 1994; 1996). Scientists seem to speak with the authoritative voice of the institution of science and are thus often granted authority, legitimation and credibility. But the credibility of scientific experts may be diminished when various scientific experts are involved in a debate and the experts disagree (Barnes and Edge, 1982, Irwin, 1995; Barnes, 2005). In the case of public disagreement of experts the idealized image of scientists as being disinterested and value-neutral can break down. For instance, Brante (1993) asks how disagreement is possible if scientists have the same background and training and portray themselves as achieving objective results. However, rather little is known about the basis of the credibility of expertise, especially in media reporting of science education. The credibility of expertise cannot be established by logical arguments alone; a variety of other factors must also be involved (Barnes and Edge, 1982; McKechnie, 2003).

The research presented in this thesis addresses this problem empirically by examining how the credibility of quoted expert sources is established in the media and if it can be enhanced or challenged by certain ways of describing the expert or framing quotes by expert sources. The credibility that expert sources have in the media can also have a positive influence on their political recommendations and public calls for action.

2.1.2.b. Controversies and networked expertise

To investigate this matter Limoges (1993) offers a processual understanding of expertise in controversy contexts. Limoges describes controversies as "controversist spaces" in which various actors and experts with completely different "worlds of relevance" meet. For Limoges, all participating groups are fully-fledged actors in this space thus expertise per se does not count more than the view of any of the other involved actors and in most cases

expertise is provided in plural and often contradictory. However, in media coverage of debates journalists mediate controversies and must make selections of the (expert) voices they want to represent. Limoges asserts that the actual issue during a controversy is the negotiation of the associations established between the different "worlds of relevance" mobilized by different participants. Such associations are not defined a priori but emerge as outcomes of the interactions between the participants. In other words, the representation of expertise develops through the course of controversies. How powerful and credible experts become in a controversy depends in this view on their ability to network and form associations.

The credibility of expertise needs to be developed within a controversy context and it is therefore not an individual but collective process. For Limoges the credibility of expertise stems from the strengths of the networks with which experts are associated in the controversy. Expertise is therefore a collective learning process which provides the experts with credibility if they are successful in addressing the articulations of various "worlds of relevance". In this sense expertise is a public process which creates the conditions of credibility of expert performance (Limoges, 1993). This notion of a networked and collective form of expertise in controversy contexts also points to formations of ethno-epistemic assemblages that transcend the boundaries between experts and lays as proposed by Irwin and Michael (2003).

### 2.1.2.c. Controversies and media reporting

An important matter is how expertise and credibility in controversy contexts are selected and represented in the mass media and therefore affect the public representation of and public opinion about controversies. Controversy may be one of the reasons why a science story is covered in the first place (e.g. Miller, 1999). Media reporting may also help to fuel a controversy by framing issues in particular ways (e.g. Holliman, 2004) or by the

selection and representation of "maverick" expert sources (e.g. Epstein, 1996; Boyce, 2006). Journalists' professional practices can influence this process of representation (Goodell, 1987; 1989; Taylor and Condit, 1988; Nelkin 1995; Peters, 1994; 1995; 1996). The research presented in this thesis is interested in the question of whether the different areas of interests of various general news reporters and specialist correspondents influence the selection of expert sources and their presentation and credibility, which will be investigated through interviews with media professionals in Chapter 5.

Another area of particular interest is how controversies become resolved. There are various patterns of closures and it is not always the case that a "sound argument" closure of a scientific or science-based controversy occurs when the scientific and technical experts disagree (Engelhardt and Caplan, 1987). Often scientific and science-based controversies need to be terminated through interventions from outside science, for instance through court decisions or political referenda (e.g. Allen, 1987; Macklin, 1987; McMullen, 1987; Rich, 1987; Martin and Richards, 1995). Sometimes they may not be resolved for many years, as in the case of the controversy over evolution (Chapter 1).

In sum, the study of controversies offers interesting insights into the interwoveness and interdependence of science and society and often challenges the idea of a superior epistemological status of science that can alone provide all the relevant answers to socio-scientific debates. Controversies also offer an interesting opportunity to study the status and politics of expertise, scientific and otherwise, and also how scientists and other experts legitimise their knowledge claims. Another interesting focus of study is the demarcation of extended definitions of experts in controversies, how credibility is ascribed to experts and whether experts form assemblages and networks with other experts and participants in controversies. These topics are investigated empirically in the Chapter 4 and 5 of the thesis.

Finally, it needs to be decided how and on what basis a controversy can be studied. One possible option is to examine its public representation in newspapers. This was the approach taken in this thesis. The first part of the empirical analysis addresses the representation of expertise in newspapers. The second part investigates the production side of newspaper accounts of a particular controversy and examines journalistic practices of the selection and representation of expert sources and their credibility. This approach was employed to investigate the role that print news media play in the representation of science and scientific expertise in a controversy. Hereby it can also be investigated whether newspaper accounts enhance or challenge the credibility and authority of certain experts and areas of expertise.

## *2.2. Science education*

The following two sub-sections provide a brief overview on the purposes of and relevant arguments about science education and the role scientific controversy can play in teaching science before the following sections will investigate science in the media.

### 2.2.1. Purposes of science education

Broadly speaking, two arguments are used to account for the purposes of science education in schools. The first reason could be called the *professional employment* argument and the second the *scientific citizenship* argument (e.g. Jenkins, 1997; 1999: 2006: Millar, 1997; 2006; Allgaier 2005b). Ideally, science education aims at satisfying both of these aims and science curricula should, in theory at least, be able to deliver both. However, there is a tension between achieving these goals and the different arguments also influence how educational development and science education is delivered, also what the content of the science curriculum should look like.

The *professional employment argument* for science education in schools is rooted mainly in the economic and professional sphere. Here science education in schools must serve the requirements of all students but particularly of the minority of students that might become professional scientists or pursue another career where scientific knowledge is required. In this regard science education should emphasise the teaching of the required facts and theories and focus on the practical skills in the processes of science (e.g. Roberts, 1997; Lijnse 2000). Here it is the requirements for post-compulsory science education that need to be fulfilled by compulsory science education. In this sense the science curriculum must aim specifically at the vocational requirements of students that want to pursue careers in science and technology (Bell and Donnelly, 2006). In addition, links have been made between specialised science education, economic growth and the ability to cope with competition in a global marketplace (e.g. Millar and Osborne 1998). This view is not brought forward by educationalists very often (see Jenkins, 1997 and Drori, 2000 for discussion), but the argument that more specialisation in science education would automatically lead to more research, which would then lead to a booming economy seems to be present among policy lobbyists and politicians in reports and quotes in the media (e.g. in Smithers, 2006, August 14). In this regard, policy arguments that link science education to the benefit of national economies are also some of the oldest arguments for science education and are practically as old as the idea of specialised science education itself (e.g. see Timmons, 2001).

The second line of argument about *scientific citizenship* aims at preparing younger citizens for an everyday life in societies that are enriched with science and technology. Many political issues and debates that are at stake for decisions are interrelated with scientific and technical theories, knowledge, and explanations (see the earlier discussion in Section 2.1.). The scientific citizenship approach in science education is therefore a crucial prerequisite and preparation for citizens to participate effectively in societies that are saturated with science and technology. It is therefore argued that to become informed and

form a personal opinion it is necessary for citizens to develop an idea how society shapes science and how science shapes society (e.g. Collins and Shapin, 1986; Shapin, 1992; Reiss, 1993; 2001; 2004; Turner and Sullenger, 1999; Sorbsky, 2000). Furthermore, it is argued that citizens require some understanding of the processes of science so that they can get an understanding of how the reliability and validity of scientific claims can be assessed and make informed judgements about decisions involving science and technology that affects their own lives (e.g. Millar and Wynne, 1988; Millar 1994). This argument suggests that when citizens know how to deal with scientific information and knowledge they will be more capable of participating and deciding about issues with a scientific content that concern their own lives (e.g. Millar, 1997) – a requirement for public engagement with science.

Scientists alone cannot provide consensual solutions to socio-scientific problems, in many cases scientific expertise is met by an opposing counter-expertise. Here the argument is that the *scientific citizenship*-approach requires a general education, developing transferable skills so that citizens can critically assess new information about science and participate in decisions about scientific issues (e.g. Claxton, 1997). Furthermore, Jenkins (1997) argues for a "functional public understanding of science" in the citizenship context and Fensham (2000; 2004) is in favour of the development of a practical science as "knowledge-in-action", which means science education should help the citizens of tomorrow to apply scientific knowledge to their own personal contexts whenever they need it. As a consequence, the content of the science curriculum must be useful and relevant to the lives of the learners.

Such an approach can be seen in the recent "Twenty First Century Science" courses (e.g. Millar, 2006). This approach should also interest pupils in science and enable the young citizens to learn where they can get valid and trustworthy information and knowledge from and how they can get access to scientific expertise when they need in for their everyday lives (Fensham, 2000; 2004).

There have been discussions about the content of the science curriculum since science was first schooled in England in the mid-nineteenth century (Jenkins, 2006). In England and Wales amendments to the National Curriculum for Science (Key Stage 4) came into effect in September 2006 (Burden, 2005). These changes were influenced by science education theory and research in science education. These amendments aim at providing pupils with an interest in pursuing a career in science and technology with a solid base in scientific knowledge that is going to be crucial for their further professional development. They also incorporate the experience made with the Twenty First Century Science pilot approach and focuses on scientific knowledge that is relevant and useful for the everyday lives of the future citizens (see also Fensham and Harlen, 1999; Jenkins, 1999).

The term scientific literacy is used to describe the outcome or the result that science education should achieve (e.g. Miller, 1983; Dehart Hurt, 1998; Allgaier, 2007a). But the ideas about what scientific literacy actually means seem to vary among scholars (see Roth and Barton, 2004) and the idea that a general scientific literacy can be achieved has also been contested (Shamos, 1995). Durant's (1993) contribution is particularly helpful. He describes and distinguishes three separate aspects of scientific literacy and combines the two different arguments for science education. In his view only all three aspects taken together can ensure that people are able to understand what science is, how it is conducted and what the links between science and society are. These three aspects of scientific literacy he describes are:

1. *Knowing a lot of science.* This refers to contents and the teaching of scientific "facts" and formulas. In Durant's view the teaching of facts alone is not enough to become scientifically literate. To understand the "issues of the day", Durant writes, new current scientific knowledge is required. And new scientific knowledge by its nature is uncertain and often controversial.

2. *Knowing how science works.* Here he refers to the processes of producing and generating scientific knowledge. This would imply a basic understanding of scientific concepts, technical terms and an understanding of methods of science for testing models of reality and an understanding of the impact of science and technology on society. Durant suggests that an understanding of these concepts could be acquired by practicing scientific work in school laboratories. Also required would be the understanding that there is no such a thing as one single "scientific method". Different scientific disciplines use diverse methods and empirical approaches.

3. *Knowing how science really works.* Here Durant refers to the social institutions and control mechanisms wherein science takes place and that science is also a socio-cultural activity. Science is actively performed by people who belong to a professional community of scientists. It would therefore be important for scientifically literate people to understand that scientific knowledge production is also a social process that takes place in certain social and cultural contexts. Another important aspect is to understand the scientific means of quality assurance, such as the peer-reviewing process.

Durant (1993) regards the encounter of pupils with factual textbook knowledge alone in school as a poor preparation for science as it is generally encountered in daily life by citizens and argues that citizens need a different education about science than scientific specialists. Science that citizens encounter, for instance, in the media is often new and also in the process of active debate among experts who are trying to judge its quality and significance (e.g. Nelkin, 1995). In this regard Nicolson and Holman (2003: 26) see it as a component of scientific literacy:

"[...] to make sense of science stories in the media, to evaluate the evidence they are based on, to consider associated risks and benefits and to appreciate how society makes decisions about the acceptance of new discoveries or developments."

It is not surprising that newspaper reports and other media portrayals about scientific issues have been introduced in school science classrooms as a way of developing students' skills in engaging with complex (socio-)scientific issues that they may encounter in their adult lives (e.g. Jarman and McClune, 2001; 2003; Dimopoulos and Koulaidis, 2003; Ratcliffe and Grace, 2003). But whether informal accounts of science and science-related issues in the media can be beneficial (e.g. Hutton, 1996) or problematic (e.g. Thomas, 2000a; Dingwall and Aldrige, 2006) for formal science learning is still subject to debate among science education experts.

Generally, citizens will rarely encounter science in a very pure form if they are not specialists. Mostly science and technology are enmeshed in specific narratives when they enter the public sphere that often also have economic, environmental, ethical or historical connotations. Furthermore, science education in schools is perceived as being quite dull by the students (e.g. Cerini et al., 2003). Science education scholars therefore argue for the inclusion of socio-scientific and controversial issues into science teaching to prepare pupils for the encounter with science in society and increase the interest, relevance and usefulness for students (e.g. Reiss, 1993; Millar and Osborne, 1998; Fountain, 1999; Ratcliffe and Grace, 2003).

### 2.2.2. Teaching controversies and socio-scientific issues

The idea of introducing controversies into the science classroom is particularly relevant to the topic of this study. Promoters of creationist theories often use the slogan "teach the controversy" to argue their point (see Chapter 1). Teaching the controversy around the

theory of evolution and creationism[8] raises various difficult questions, for instance, which religious accounts of creation should be selected in a multicultural and multi-faith society (Reiss, 1993; 2000). The teaching of religion is (sometimes) divided along religions and not subject to statutory programmes of study (DfEE, 1999). However, all children have to study science education.

The controversy about religious versus scientific accounts of human origins involves various worldviews, values and beliefs, just like many other science-based controversies (Wellington, 1986; Oulten et al. 2004). If one agrees that there is a controversy to be considered it cannot always be settled by the recourse to logic, reasoning or experiment and often there is more than one "answer", if there is an "answer" at all. Furthermore, competing and sometimes conflicting knowledge and worldviews can coexist: a student can *understand* and be able to explain the theory of evolution but still *believe* in a religious worldview (Allgaier and Holliman, 2006).

Research about teaching new and controversial issues suggests that there are more general problems with teaching controversies in science education. For instance, it is not always the case that science teachers are willing to teach controversies (e.g. Levinson and Turner, 2001; Gayford, 2002). Often they do not feel confident about leaving what they consider to be the safe terrain of scientific fact and theory and venture into the uncertain terrain of relationships between science and society (Levinson and Turner, 2001; Gayford, 2002). Other challenges are the personal views of teachers and how they deal with it in teaching as well as the difficulty of teaching controversies in a balanced way (Levinson and Turner, 2001) or the loyalty of science teachers to their subject discipline (Gayford, 2002; Oulten et al., 2004). Scientific controversies often also involve new and unproven scientific knowledge and issues and the science involved may be too complex and difficult to be directly used in science teaching (Thomas, 2000b). Another more practical problem in

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[8] Cassidy and Barnes (2004) offer some materials how the controversy around the theory of evolution and creationism could be taught in science education.

teaching controversies is how the learning effect can finally be assessed (Jenkins, 1997; Sorensen, 2000).

Many of the social perspectives on science by scholars of the sociology of science and science studies have influenced the developments in science education and have been taken up by science education scholars and practitioners in science teaching (e.g. Millar, 1989; Solomon, 1993; Roth and McGinn, 1997). Also the importance of formal school science for further initiatives of bringing science and society together has been widely recognized by science educators (e.g. Cajas, 1999; Fensham and Harlen, 1999; Solomon and Thomas, 1999). School science, it has been argued, has to respond to the new social contexts of science, technology and knowledge production and help young people to engage reflexively with science-related issues – therefore also theoretical concepts such as Irwin's (1995) "citizen science" have been explored by science education scholars (e.g. Jenkins, 1999; Roth and Barton, 2004).

Sociologists of science and science studies scholars, however, showed rather little interest in the relationships between science, education and society, particularly concerning primary and secondary science education (see Delamont, 1989; Roth et al., 1996; Turner and Sullenger, 1999; Hodgson, 2006). Few science studies authors mention education in science in passing (e.g. Kuhn, 1970; Fleck, 1979; Collins and Pinch, 1993; Fuller, 1997; Collins, 2007) and a few studies have examined the enculturation processes of professional scientists (e.g. Delamont and Atkinson, 2001; Roth and Bowen, 2001; Campell, 2003; Kaiser, 2005). These studies focus on higher education and provide valuable insights on how students of scientific subjects slowly become "enculturated" as members of the professional culture of science. They also add that it is part of the role of scientists working at universities to take care of novices to science and supervise and socialize them into the scientific community through formal and informal procedures (see also Ziman, 1978).

Lave and Wenger (1991) examine processes of "situated learning" and stress the importance of understanding learning as social participation in "communities of practice"

with shared repertoires of communal resources (such as routines, artefacts, styles or vocabulary). The more one learns about the practices of a certain community the more the learner moves from the periphery into the centre of a "community of practice". This does not only apply to the learning of science, but also to other practices. In this sense the community of scientists working on evolutionary processes in organisms, science education practitioners or news reporters and special correspondents can all be understood as sharing common (professional) practices and routines and therefore "communities of practice" respectively.

The notion of communities of practice draws attention to the need of understanding knowledge, activity and learning in context (Lave and Wenger, 1991). Here it is possible that science education teachers take on some of the routines, values and norms of the scientists since they have a similar training as the scientists and might therefore share a particular view of science. Furthermore, some science correspondents also have a science background and are therefore partly "enculturated" into a particular view of science that may be in conflict to being a journalist (Hansen, 1994; Nelkin, 1995). It will be shown in Chapter 5 that the science correspondent interviewed for this study also has a formal training in science and did a science degree at university.

Various interdisciplinary approaches have made further valuable contributions to a better understanding of the links between representing, learning and teaching science and society (e.g. Collins and Shapin, 1986; Millar and Wynne, 1988; Millar, 1989; 1994; 1997; 2006; Jenkins, 1997; 1999; 2006; Reiss, 1993; 2000; 2001; 2004; Solomon, 1993: Solomon and Thomas, 1999, Ahrens, 2005). However, the links between the reproduction and transmission of science and scientific knowledge and the public image of science and technology in media reports of science education are still theoretically under-explored and raise further interesting questions.

The content of science curricula is a social product and various interested groups struggle to try to influence what kind of scientific knowledge is legitimized through an inclusion

into the curriculum (e.g. Goodson, 1994; Hodson and Prophet, 1994; Allgaier and Holliman, 2006). Influencing the content of the science curriculum is one of the strategies that also creationists pursued in order to disseminate and legitimize creationist thought as scientific (e.g. Gieryn et al., 1985; Nelkin, 2000a). Science curricula are in this sense boundary objects (Star and Griesemer, 1989) where various social worlds and interests meet and key sites for the definition of the boundaries of science.

## *2.3. The sociology of science (education) in the media*

This thesis examines science education in the media through reporting of a single case study. Much research has been published on science in the media but relatively little of that deals with science education. That is the reason why the literature on science in the media will be applied to this case study about science education with a view to extending this body of work in a new direction. In what follows the literature on (science) news production will be reviewed, as well as on the topic of science in the (news) media, the use of expert voices in the media, the journalistic notion of objectivity and promotional strategies of sources.

### 2.3.1. The sociology of news production

Mass media are technical means for communication (Williams, 1995) and carriers of information designed for reaching mass audiences (e.g. McQuail, 2003). They have the potential to influence public discourses and affect the public agenda of events that matter politically, culturally and socially (e.g. McCombs and Shaw, 1972; 1993), although these effects cannot be predicted in advance. The news media are a particular branch of the mass media that disseminates information (news) and represents (news) events selected according to their news values (e.g. Allan, 2000). Different media outlets constantly

observe each other and by doing so they can themselves influence or be influenced by the news agenda of other media channels (e.g. Luhmann, 2000). News media include print media (newspapers, magazines), broadcast media (radio and television), and increasingly internet-based media (web pages, (we)blogs). This study focuses on (national, regional/local and specialist) newspapers alone that are published in the United Kingdom (see Chapter 3 for a detailed description of the newspaper sample).

Journalism is a professional activity that is concerned with the collection, compilation and (re)presentation of information regarding current events, issues, trends and people. In so doing journalists have to select particular events and sources and thereby they are mediating reality by reporting news (e.g. McNair, 2004). Tuchman (1978: 179) describes news, the product of journalistic professional practice, as "a depletable consumer product that must be made fresh daily".

Thompson (1995) identifies three elements of mass communication: production, content and reception. All three elements are linked but can be delineated for the purposes of study. The producers of traditional forms of news media (such as newspapers) and the media recipients are dislocated in time and space but nonetheless linked. However, the recipients of traditional media content are in a fundamentally unequal position in the processes of symbolic exchange since they have relatively little influence on the production of news. Journalists and other media professionals therefore maintain a strategic advantage in defining the news agenda.

The methodological design of the research presented in this thesis is inspired by the works of the sociological discourse analyst Reiner Keller (1997; 2001; 2004a; 2004b; 2005a; 2005b). Keller argues from a perspective of the sociology of knowledge. In this regard he claims that it is particularly interesting to investigate manifestations of (knowledge) discourses, such as in newspaper accounts of science education. Keller further suggests investigating the producers and production processes of the (knowledge) discourses that can be found in manifestations, such as newspaper articles.

What follows for this thesis is that the empirical approach is twofold: the first part is an analysis of media content about the controversy around teaching creationism and theory of evolution that illuminates what was published, who the expert sources were that were quoted, what they said and how they were described. The second part focuses on the production side of news and analysed interviews with media professionals about their journalistic practices that were relevant in the reporting of the controversy and the selection of the expert sources. An empirical approach that is able to analyse media content and media production in relation to each other is seen as more meaningful than approaches that examine these connected elements in isolation (e.g. Elridge, 1993; Miller et al., 1998; Philo, 1999; Holliman, 2004; 2004).

Whether news media have the power to define the meaning of issues and public agendas alone (e.g. Louw, 2001) or whether news media have to be seen as one powerful key player in the framing of public debates that is able to influence and at the same time being influenced itself (e.g. McCune, 2003) is contested. However, both approaches agree – and this is an a assumption adopted in this thesis – that the way issues, expert sources and controversies are framed and represented matters and can have an influence on public opinion and decision-making processes (see also Martin et al. 2006) but that these effects are not easily predicted. Studying a controversy about science education in the media can therefore shed light on how a particular science education issue is represented and which issues of the controversy are presented as being more significant than others and which expert sources are seen as credible and relevant and talking with authority about what should be taught in sciences classes.

News reporting is a collective activity. Not only journalists, but also editors and sub-editors, sources and informers as well as the public contribute to the journalistic product (Conrad, 1999). Journalists have often been called gatekeepers to refer to the power of giving or withholding access to different voices in the media (Clayman and Reisner, 1998; McQuail, 2003). Gatekeeping often involves several selection processes over the period of

news production and often group decisions are involved in these processes (Shoemaker, 1991). However, the assumption of journalists being powerful gatekeepers has been contested, for instance since the study of gatekeeping processes alone minimizes the complexity of news-making by focusing on a single aspect in range of various interactions and processes (e.g. Schudson, 2000; 2003).

The processes of news gathering and production are influenced by several constraints and motivations, this means journalists, reporters and specialist correspondents are not completely free to write and publish what they want, for instance time and space are limited resources in news production (e.g. Goodell 1987; 1989; Nelkin, 1995; Weingart, 1998; Schudson, 2000; 2003). Furthermore, Holliman (2000) distinguishes selection processes *for* the newsroom (e.g. by academic journals and public relation consultants) and selection processes *in* the newsroom. Both will be investigated in this study in Chapter 5.

Then there are editorial constraints (e.g. Schudson, 2000; 2003). Generally editors are seen as powerful actors in news-making processes and the motivation to pass the editor(s) and get their story published drives many reporters and specialist correspondents (e.g. Nelkin, 1995). Clayman and Reissner (1998) studied editorial conferences and concluded that editorial staff negotiate the content of news production in social and collaborative processes but extra-journalistic and organisationally driven considerations still influence news selection processes.

Apart from the editors, audience assumptions (e.g. Nelkin, 1995: 112), consumer demand and political regulation (Curran, 2002), economic pressure and market constraints (e.g. Smith, 1996) and also legal frameworks (Schudson, 2000; 2003) can have an influence on how news are selected and manufactured. In this regard, the production, content and reception of news are linked.

Louw (2001) stresses the importance and influence of ownership issues that can also have an effect on what individuals and kinds of correspondents and reporters are employed in a media organisation. However, whether a newspaper is a national or regional publication or

a specialised publication can also have an influence on the types of reporters and correspondents that are employed in the media organisation (e.g. Aldrige, 2007; Richardson, 2007). Different types of newspapers (national, regional/local and specialist ones) have been included in the sample to investigate whether there are differences in newspaper coverage about the controversy around teaching creationism and the theory of evolution (see Chapter 3 for details of the sample).

Furthermore, journalists are socialized and enculturated into their own professional culture learning the craft and rules of journalists on the job – and often "doing" journalism is the only way of learning "how to do" journalism (e.g. Tuchman, 1972; Halloran 1998; Ryfe, 2006; Schultz, 2007). The values, rules and routines of the professional culture of journalism are often not clearly spelt out and journalists need to develop some sort of intuition about what counts as news or how to write a news report that passes the editors' selection processes (e.g. Tuchman, 1972; Schudson, 2000; 2003; Schulz, 2007). "On-the-job-socialization" (Louw, 2001: 160) and the successful interaction with other journalists lead to the adoption of a professional identity including an occupational ideology (Deuze, 2005). Similar to the scientific community successfully enculturated journalists become members of a particular historically contingent professional community of practice (see also Singer 2003 and the discussion in Section 2.2.2.).

The production of news stories should not be understood as neutral and objective. Media accounts of reality are socially constructed (e.g. Schudson, 2000; 2003) and Miller (1999) stresses that news accounts of issues are heavily mediated and involve more actors and elements than just the media professionals. These various actors and elements are in dynamic relationships in the news production process. As Nelkin (1995) and others (e.g. Allen, 2000; McQuail, 2003) observe, although press coverage is interpreted and contextualized in a range of ways by different audiences, the framing of topics and controversies in the news media can also have an influence on personal opinion and public policy decisions (e.g. Miller and Beharrell, 1998; Philo, 1999). Framing here relates to the

ways news information is represented as a partial, heavily mediated account of "reality" (Goffman, 1975; Tuchman, 1976; Schudson, 2003; Martin et al., 2006). In this respect, McQuail (2003) stresses that news media reports are not objective accounts of reality. Allan (2000) goes one step further and argues:

> "As a form of social knowledge, a discourse identified as 'news' exhibits certain evolving yet characteristic features which are shaped in accordance with cultural rules or conventions about what constitutes 'the world out there'. That is to say, while journalists typically present a news account as an 'objective', 'impartial' *translation* of reality, it may instead be understood to be providing an ideological construction of contending truth-claims about reality. This is to suggest that the news account, far from simply 'reflecting' the reality of an event, is effectively providing a codified definition of what should count as the reality of the event." (Allan, 2000: 4, emphasis in original)

This implies that different media accounts can provide different realities. The content of media products is inseparably linked to the context of its production. This is why it is useful to study both in relation. What is news and what is not is selected along criteria of "news values" of events that often depend on the subjective judgement of a range of media professionals (e.g. Allan, 2000; Palmer, 2002). The interviews with media professionals will examine the particular news values of the controversy around teaching creationism and theory of evolution in science classes (see Chapter 5).

### 2.3.2. Reporting science (education) in the media

It is possible that various specialisms of correspondents involved in reporting the news affect the professional practice of journalists, their selection of expert sources and how they covered the debate. The case study described in this thesis addresses this issue empirically by first investigating what kinds of journalists and correspondents reported the controversy and second by interviewing various media professionals about their

professional practices. The outcomes of this investigation can then be compared to the results of the content analysis.

Here it is important to note that the amount of literature on specialist correspondents varies. Although the media profile of education stories has risen (Baker, 1994) and more and more specialist education correspondents have been employed by some newspapers and broadcast media (see Baker, 1994) the professional practices of educational correspondents is under-examined (Baker, 1994; 2000). Not only the work of educational correspondents, but also the way education is covered in the news media more generally has been rather neglected by media researchers and the literature on the topic is sparse (for examples, see Pettigrew and MacLure, 1997; Jones, 2000; MacMillian, 2002; Hammersley, 2003; Ellsmore, 2005; Hargreaves et al., 2007).

In contrast, the topic of science in the media has received a great deal of attention and the literature on the subject is, relatively speaking, extensive at least when compared to the topic of education in the news (e.g. Dornan, 1990; Peters, 1994; 1995; 1996; Nelkin, 1995; Lewenstein, 1995; Bucchi, 1998; Gregory and Miller, 1998; Weingart, 1998; 2005; 2006; Miller et al., 1998; Conrad, 1999; Miller, 1999; Hargreaves et al., 2003; Schibeci and Lee, 2003; Holliman, 2000; 2004; 2007; Cook, 2004; Junge and Ohlhoff, 2004; Cascais, 2005; Cook et al., 2006; Boyce, 2006; Dhingra, 2006). The professional practice of correspondents who specialised in the coverage of science news and the consequences for the production of science news has also received analytical attention (e.g. Hansen, 1994; Nelkin, 1995; Conrad, 1999; Holliman, 2000; 2004). Furthermore, the correspondents and reporters specialising in science news have reflected on their professional practice (e.g. Detjen, 1995; Radford, 1996; 1997, Wilkie, 1991; 1996; Highfield, 2000; Rensberger, 2000; Goede, 2002; Schnabel, 2003; Gallagher, 2004; Wormer, 2006; Whitehouse, 2007). Here it is relevant that there is general agreement among the science correspondents that the way they write about science differs from scientists' writings about science, for instance journalists have to attract the interest of a general (newspaper) readership whereas

scientific experts write their articles for scientific specialist peers (e.g. Radford, 1996; 1997). Some science journalists also note that it cannot be their primary job to educate the public about science since they are working for commercial enterprises determined to sell as many newspapers as possible (e.g. Wilkie, 1991).

The case study described here makes a contribution to the literature on science education in the media and the journalistic practice of education correspondents by applying the existing literature on science in the media and the professional practice of science journalists to the controversy around teaching creationism and the theory of evolution as well as to the working practices of the interviewed correspondents.

### 2.3.3. "Expert sources" in the media

This study investigates representations of expert sources and what they are saying in newspapers in a controversy about science education. Expert sources are an essential factor in journalistic practice and the production of news especially concerning news about science and technology (see Peters, 1994; 1996; Miller, 1999; Albaek et al., 2003; McNair, 2004; Boyce, 2006).

Journalists and special correspondents can employ expert sources for different uses. Conrad (1999), for instance, asserts that different expert sources can be used to provide context, legitimation, explication, and balance in news accounts. Coleman (1997) stresses the importance of the use of expert sources that can add credibility, legitimacy and authority to particular framings, especially in controversial issues that are concerning science and technology.

The most direct way of representing an expert is by quoting her or him in direct speech (Gibson and Zillmann, 1993; Sprecker, 2002). Research on the impact of direct quotes suggests that:

"[...] testimony from sources who are directly quoted is given more credence than the same testimony paraphrased and potentially modified by journalists as secondary sources" (Gibson and Zillmann, 1993: 800).

Conrad (1999) distinguishes five ways in which quotes by scientific expert sources in science reporting can be used in news media:

1. Quotes can be used to provide the context of a news story.
2. A common use of quotes from scientific experts is to legitimize research findings.
3. Quotes of scientific experts can sometimes explain an issue better than the science writer could.
4. A convention in journalism is to use quotes to achieve the journalistic norm of balance in a story.
5. Another use of quotes by scientific experts can point to the implications and consequences of scientific research.

The journalist is, up to a point, able to choose which views she or he wants to represent directly. Here, also the order in which quotes by experts are presented might have an influence on the interpretation of their importance by the media audience. Richardson (2007) describes the use of direct quotes by journalists as a professional way of distancing themselves from the quoted person. But the direct quote is inevitably framed by journalists' reporting clauses employed to introduce the expert and the quote. Richardson therefore suggests considering the relationship between the quote and the rest of the text in which it appears. Steward et al. (2001) note that most of the conversations between journalists and sources in news reports are generally paraphrased and actual direct quotes often serve only as sort of a "punch line" – this linguistic device is then called "foreshadowing" the quote. This suggests that direct quotation is a powerful journalistic tool that can be used to frame arguments in particular ways.

However, journalists have also the means to use quotes to express their own point of view in somebody else's voice (see also Tuchman, 1972), often with added credibility. For instance, if a reporter personally dislikes a new emerging technology it might sound more credible if she or he quotes an established expert criticizing harmful side effects of the technology on a technical ground instead of using her or his own words. Credibility can be reinforced or challenged through the framing in articles (Richardson, 2007). Credibility can therefore be challenged or enhanced through the use, selection and framing of quotes and the way how expert sources are described.

The research presented in this thesis addresses questions of credibility empirically by examining how the quoted expert sources are described in the newspaper coverage and if there are ways of describing expert sources that can enhance or challenge their credibility. It also investigates selection criteria of expert sources by media professionals.

There are other professional and practical issues that need to be considered. Here, Conrad (1999) discovered attributes that make some expert sources particularly "good sources" for journalists. From a very practical point of view this means that not all expert sources are equally "good" (see also Nelkin, 1995). The fundamental attribute that constitutes a good source is accessibility and also availability for the journalists. "Good sources" are knowledgeable, articulate and return reporters' phone calls (and/or emails) in time. These "good" expert sources must be able to put their statements in context or be able to give reporters an understandable perspective and some experts are better in saying things that work for a newspaper than others. If they can present information in a succinct, straightforward manner and are good in explaining things over the telephone then the journalists are more likely to consider contacting them again. Articulate expert sources who can "turn a phrase" are more likely to be valued. Space for (long) quotes is always limited and "sound bites" make journalists' lives a lot easier. Sometimes also the prestige and "sound" of the institution where the expert is employed outvalues the (technical) expert status of the source and adds credibility to (scientific) expert sources:

"It is commonly believed that a quote from a dean of a prestigious medical school will be more persuasive than a quote from post-doc or bench scientists in the lab, who may be far superior technically."
(Conrad, 1999: 291)

Reporters sometimes also select "predictable sources", people whose views are well known and who can often be expected to take certain positions and viewpoints (Conrad, 1999; Nelkin, 1995). In sum, experts are selected not necessarily by their expertise on a subject matter alone but also along more practical journalistic criteria.

However, the selection of particular scientific expert sources that deviate from the consensus view of the scientific community can also fuel controversy as Boyce (2006) illustrates with the example of Andrew Wakefield, a medical researcher who suggested that MMR vaccination could possibly cause autism in children.

Another issue that is especially relevant in controversy contexts is whether expertise is acknowledged by the media and other participants of the debate (Nelkin, 1987; 1995). Media professionals select which expert sources they want to represent thereby they give some experts the opportunity to develop a public authority while others will find it hard to make themselves heard (Arnoldi, 2007).

Scientists and researchers (especially those working at universities) are generally ranked highly in trustworthiness and credibility (e.g. Sprecker, 2002; Lang et al.; 2003; Wingenbach and Rutherland, 2005; European Commission, 2005a; 2005b). Exposure to media coverage can add to the credibility of particular groups and organisations but also challenge it. As shown in the case of the AIDS activists above sometimes "lay expert" groups managed to be acknowledged as credible and trustworthy experts by employing credibility tactics (for instance, Anderson, 1993; Epstein, 1995; 1996; Miller and Beharrell, 1998; Conrad, 1999). The AIDS activists represented an alternative form of expertise by representing the valid voices of people suffering from the infection. Michael (2006) proposes that positions on technoscientific issues can be rendered authentic, plausible and

credible by the fact that one has suffered and by publicly demonstrating an emotional involvement. Journalists can then frame stories about suffering from a "human interest" angle (e.g. McQuail, 2003). This applies not only for citizen or advocacy groups but also for spokespeople of scientific or bureaucratic institutions (Michael, 2006).

Linne (1993) points to the importance of personal experiences of journalists with their expert sources over time. These experiences can influence the perception of reporters on potential expert sources and negative experiences made once with a particular expert source or organisation can result in the refusal of contacting them again and other voices being represented in the news report instead. Subjective judgements – often based on what the journalist has learned about the expert before through other media accounts (e.g. Kitzinger, 2000) – and a personal take on the relationship between the expert and the journalists are factors that practically influence the credibility of expert sources in the hectic world of news reporting.

This research investigates if different specialised and general news reporters and correspondents have different views on which kind of expert sources are relevant to particular news stories. This might also affect the notion of credibility they ascribe to their sources and experts and also to what they are saying. Becker (1967) introduces the concept of "hierarchies of credibility". The expertise of different actors is not equally relevant in particular contexts from various viewpoints. This concept will be used to investigate if the different journalists and specialist correspondents in this study have the same ideas about which expert sources are relevant and credible in the controversy about teaching creationism and the theory of evolution or if correspondents with different specialisms and different connections with expert sources had varying notions of the hierarchies of credibility that influenced the processes of expert source selection (see also Miller and Beharrell 1998; Allen 2000). Credibility and the use of expertise is investigated in this study in order to find out what the role of experts is in newspaper representations of

science education and what the reinforcement or the challenge of credibility means in relation to the authority of experts speaking about science in schools.

The literature that is available on the professional practice of science correspondents stresses that science reporting is often one-sided because of an over-reliance of science journalists on only a few scientific expert sources which have established and often close personal relationships with the media professionals (e.g. Shepherd, 1981; Goodell, 1987; 1989; Dornan, 1990; Hansen, 1994; Nelkin, 1999; Conrad, 1999). These relationships to expert sources can lead to an uncritical and favourable representation of what they are saying. Nelkin (1995) argues that it is also the social and educational biases of science writers that can affect the way they write about science, for instance, when journalists are trained extensively in science they may have adopted the values of scientists and might therefore be less discerning or investigative regarding statements of scientific experts. Various specialist correspondents might also rely on different kinds of expert sources that are specific to their own area of specialism. Science journalists visit scientific conferences, talks and presentations, read and follow scientific journals and receive "embargoed" press releases from scientific institutions and pre-published articles from science journals (e.g. Hansen, 1994; Nelkin, 1995, Holliman, 2000; 2004; Whitehouse, 2007). As such, they rely on certain sources of science news, but at what price?

### 2.3.4. The journalistic notion of objectivity

"Objectivity" in the production of news is an important professional norm in journalism that also serves to distinguish professional journalism from non-professional forms of news transmission (Hemanus, 1976; Schudson, 2001; 2003; Singer, 2003; Deuze, 2005; Starkey, 2006). However, the notion that it is possible to provide an "objective" and completely impartial view of reality has been challenged and in practice it is rather the case that journalists try to approximate an "objective" form of news reporting through various

practices (Allan, 2000; Lichtenberg, 2000; Louw, 2001; Starkey, 2006). These practices involve various criteria that professional journalists must follow if they want to be acknowledged as professional correspondents and reporters by their peers (Ryfe, 2006). Objectivity is a professional standard not only for media professionals working for the elite press or in national broadcasting, but also journalists, correspondents and editors of the tabloid press refer to standards of objectivity when they talk about how they are processing news (Deuze, 2006). The norm of objectivity in news ideally involves various criteria such as, for instance, factuality, neutral or balanced reporting which is often related to a general "fairness" of accounts, accuracy and impartiality (McQuail, 2003). In practice, objectivity is not a static concept. Different reporters and newspapers can produce different accounts but still claim to be objective (e.g. Ryfe, 2006).

Tuchman (1972) understands objectivity in news reporting as a "strategic ritual" that is invoked by journalists and reporters to protect themselves and their work from libel suits or pressure from their superiors. Some of the strategies to do so involve the (re)presentation of supporting evidence or the presentation of potentially dangerous ideas and statements in quotation marks so that these are framed as somebody else's and not the reporter's opinion. Reporters also use quotations marks to show the account is what was said and that it is an accurate report. Another strategy is the balanced reporting of news that involves the presentation of conflicting positions within a given area of dispute or controversy.

The nature of an article also matters, for instance more expert source accounts can be represented in a long article and less in an article that is only a few lines long. Also the inverted pyramid structure of articles ensures that the most important facts and accounts come first in a news report, less important statements come towards the end of an article and can easily be cut by sub-editors during the editing process (Allan, 2000; Schudson, 2003).

However, it is especially the literature on science in the news that points out that the journalistic norm of balanced reporting can also be problematic and an obstacle to

objective science news reporting. Goodell (1987), for instance, thinks that "artificial balancing" can lead to distortions in the reporting of news about science and technology, especially in controversy contexts. She holds that the emphasis on balance is altering the ground rules of science when the controversy moves from internal scientific discussion to the public arena. This might give critics who have little credibility in the scientific community proportionally greater attention in the media. Dearing (1995) has investigated the issue of maverick scientists in the media in more detail and concludes that balancing can add credibility to scientists that hold little credibility in the scientific world and deviate from the scientific consensus (see also Boyce, 2006). The norm of balanced reporting therefore can serve to potentially publicise and legitimize alternative accounts in science and devalue mainstream scientific consensus even if the journalists themselves think that the maverick scientist lacked credibility (Dearing, 1995). For instance, Peter Duesberg, a professor of molecular and cell biology, gained media prominence for attacking the scientific consensus view on AIDS when he claimed that AIDS was not caused by the HIV virus (see Epstein, 1996) and Andrew Wakefield was visible in the media when he claimed that MMR vaccination could be harmful to children (Boyce, 2006).

The notions of objectivity between scientific and journalistic communities of practice are quite different (e.g. Peters, 1995; Radford, 1996, 1997). Whereas in science the consensus in the scientific community about an issue being verified by empirical evidence is crucial in determining the validity of an account (see the earlier sections in this chapter) the journalistic norm of balance leads to a view about objectivity that emphasizes disagreement through the presentation of two or more (often polarized) views on one issue. Journalists assume that different views on an issue will balance each other out and therefore help to get a "full picture" so that the readers can make their minds up. Nelkin (1995) therefore asserts:

> "The idea that standards of scientific objectivity can be met by fair and balanced presentation of different points of view persists, however, as is evident in the reporting of technological controversies. [...] Ironically, this notion of objectivity is meaningless in the scientific community, where the values of "fairness", "balance," or "equal time" are not relevant to the understanding of nature. On the contrary, scientific standards of objectivity require not balance but empirical verification of opposing hypotheses. Simply to balance sides gives readers little guidance about the scientific significance of different views. Though journalists' norms of objectivity were initially modelled on scientific method, their current implementation in reports of scientific disputes is very often a source of irritation to the scientists involved." (Nelkin, 1995: 88)

In this sense the scientists have an absolutist position on objectivity: they argue that the evidence and facts speak for the truth and that it is not the scientists who speak for the facts. Compared to this the journalists have a pluralist understanding of objectivity; the presentation of various views on an issue will allow the reader to make an approximation of what they consider to be the truth.

The journalistic norm of balanced reporting can have consequences not only for controversies amongst scientists but also when there seems to be consensus amongst the scientific community and scientific knowledge is attacked from outside the scientific community. As mentioned earlier, the theory of evolution is "ready made science" (Latour, 1987) and not controversial among the scientific community. It has been argued that in public representations of debates about creationism (and intelligent design) advocates for these positions gained visibility and maybe even credibility through the journalistic norm of balance as they were given equal billing when compared to the statements of opposing professional (pro-evolution) scientists. Creationists also presented themselves as scientific experts and claimed that as professional scientists and according to the norm of scepticism they must question also established views (Taylor and Condit, 1998; Mooney and Nisbet, 2005; Rosenhouse and Brand, 2006).

Allan (2000) introduces the work of Hallin (1986; 1994) to show how the ideal of objective reporting can be influenced by "political" circumstances and thereby influence

the choice of sources. This process, Hallin argues, is influenced by the instincts of journalists and points to a "politicized" character of source credibility (see also Schudson, 2003). Following this argument the further away the source is from the "political" consensus the less likely is the source to gain access to the media. Hallin distinguishes three different conceptual spaces in which news reporting can take place. First, a sphere of consensus; second, a sphere of legitimate controversy; and third, a sphere of deviance:

- According to Hallin, the first space is *non-controversial* and one of consensus, the journalists therefore see no need to present contrary viewpoints and the consensus situation may not even be newsworthy as such.
- In the space of *legitimate controversy* journalists see issues and subjects appropriate for discussion and dispute and the journalistic norms of objectivity and balance will be the paramount values in news reporting.
- Actors whose view is unworthy of being heard are located in the third space, the sphere of *deviance*. Hallin (1986) states that in this sphere all pretence of journalistic objectivity and neutrality will be dropped and balanced accounts will not be found in news reports in this case. In this sphere the role of the journalists is to implicitly reinforce the "political" consensus and to exclude the adversary from the public agenda (Allan, 2000).

These three categories will be applied to the statements of the various interviewed media professionals on objective reporting in order to see whether they have different understandings of the controversy they reported and whether that effected their notion of whether accounts of the debate around Emmanuel College needed to be balanced or not (Chapter 5; Section 5.2.7.). The statements of scientific and other expert sources will be examined in the content analysis in Chapter 4.

### 2.3.5. Promotional strategies and information subsidies

An important question in expert source representation is the issue of access and who it is that has regular access to the media (e.g. McNair, 2004; Schudson, 2003). Many studies on news production have argued that there is an over-reliance on official sources in news reporting (for overviews see McQuail 2003; Whitney et al., 2004). More recent contributions and studies on news production emphasize the importance of studying source strategies, also that of non-official organisations and their influence on news agendas (e.g. Anderson, 1993; Linne, 1993; Miller and Beharell, 1998; Holliman, 2000). Furthermore, the planned and often commercial use of promotional strategies in news reporting through professional information brokers and public relation agencies is another topic that needs to be taken into account in thinking about source and expert access to the media (e.g. Davis, 2000; Miller, 2002; Louw, 2001; Holliman, 2000; 2004). This affects expert sources and expertise, for instance when the experts working at higher education institutions compete with expert sources of well-connected commercial think tanks and private research institutes for representation in the media (Arnoldi, 2007).

Gandy (1982), from a political economy of news perspective, understands information as a commodity with an economic value. He is also interested in the relationships between sources and the media and developed the concept of information subsidies to investigate this relationship with a particular focus on the strategies of sources. He defines information subsidies as:

> "Efforts to reduce the prices faced by others for certain information, in order to increase its consumption." (Gandy, 1982: 8)

In other words, information subsidies are means that minimize efforts and the use of resources in accessing certain information. A common way of doing so is by issuing electronic press releases. The use of the internet and other information and communication

technologies (introduced since Gandy conducted his study) that can be accessed and used directly from the desks of the target audiences might be cheaper, quicker and easier to use and therefore prove to be more effective than the conventional press conference (for discussion see Allan, 2006; Holliman, 2000; 2007). Many actors and organisations use information and communication technologies to promote their message without the aid of media, for instance by putting up websites. Also most of the key organisations that appear in this study have internet sites. These are sources that can be used by journalists, but they are produced and designed for various audiences and users and not specifically for media professionals.

Gandy (1982) also stresses the crucial role of information and information subsidies in decision-making processes and public policy. His study provides various examples of how various actors gain access and influence through offering and promoting the information they had and wanted to be disseminated, e.g. in education, science and technology.

The notion of information subsidies has been taken up for instance by Holliman (2000; 2004) and Miller (1999) in explaining how various individuals, organisations and institutions promote their opinions, findings and views outside the newsroom. However, in investigating how sources deal with information it is also important to consider that sources might hold back information deliberately or wait for an especially advantageous moment to either release specific information or – often reported in political circles – anonymously "leak" information to the press and other media for the source's own advantage.

In sum, these studies stress that it is also important to consider how sources and experts employ promotional strategies to get access to the media and influence their selection and representation which will be analysed in the production analysis in Chapter 5.

## 2.4. Conclusions

This chapter has reviewed the literature that forms the theoretical background of this study. It started with a general view on how sociologists understand science and its place in society. Following these arguments science is the outcome of human activities and generally practised by a professional group of people: the scientific community. The scientific community operates on the basis of professional norms such as objectivity and scepticism. Once consensus on a theory or hypothesis is established the issue is not controversial within the scientific community any more and means that "science in the making" has become "ready made science" (Latour, 1987). The theory of evolution is now the consensus view of the scientific community on the origins of life.

Sociologists understand scientific knowledge as situated in specific local, historical, cultural and social conditions of its generation. Scientific knowledge is therefore socially manufactured rather than discovered. Scientists also actively demarcate science from other forms of knowledge in social processes of "boundary-work" (Gieryn, 1983; 1995; 1999). Also the challenged divide between science and its public(s) has shown that the divide between scientific experts and non-expert publics is less clear cut than is often assumed. The discussion also suggested that expertise should not only be understood in singular and individual terms, but that it is also necessary to consider collective and net-worked forms of expertise in controversy contexts. The boundaries of science and society change over time due to a number of factors, not least the documenting of new scientific knowledge and novel practices in science.

Two other key sites for the definitions of the boundaries of science are science communication (e.g. in the media) and formal science education in schools. How science is communicated and represented are social processes that are important for the documenting of new scientific knowledge and its dissemination. Science communication in the media has an influence on the public representation and the public image of science and what

members of the people know and think about science. However, the operational logic of media professionals is different from the one of scientific experts. This might result in two different understandings of how science works and how it can or should be represented.

Formal science education in schools is relevant in terms of defining how citizens understand what science is and what is not and various experts have different ideas about how the science curriculum should look like. Science curricula are social constructs subject to change and different groups of experts have different ideas about what and how science should be taught. Scientific knowledge that is taught in school also has an impact on (re)drawing the boundaries of science by legitimizing some parts of science and neglecting others: science curricula are selections of scientific knowledge and not all that is known in science can be taught in science education.

This thesis makes a contribution to these important issues by investigating the complex relationships between these sites in a controversy about science education in newspapers. Here, it focuses on the role of expert sources quoted in newspaper coverage and the meaning of credibility in a controversy context. The thesis is also particularly interested in whether journalistic practice and specialisms had an influence on the selection and representation of these expert sources and their credibility. Here, one crucial question is whether different journalistic practices led to different representations of science education, implicit understandings about the nature of science and the authority of certain expert sources in speaking about science and science education. The next chapter explains the methodology and the methods used in the study in detail. Chapters 4 and 5 present the findings of the study.

# 3. Methodology

This chapter reviews the methods used in the empirical studies conducted in this thesis. It describes a pilot study (3.2.1.) and the main study including the sample of UK newspapers (3.2.2.) that served as the basis for further investigation of media content. A following section (3.2.3.) describes criticisms of online sampling and how these were addressed. The next section explains the quantitative (3.2.4.) and qualitative (3.2.5.) analysis of the sample of UK newspapers. A further section describes the production sample of media professionals that were interviewed in the study (3.3.1). Moreover, it shows how semi-structured interviews were used to investigate media production processes (3.3.2.) and how the interviews were analysed through the application of a qualitative approach of data analysis (3.3.3.). A final section (3.4.) summarises additional strategies of data collection that were applied in the study.

## *3.1. The empirical investigations and the use of methods*

The methodological approach of this study was inspired by sociological approaches to discourse analysis (e.g. Gilbert and Mulkay, 2003) and particularly Reiner Keller's approach from the sociology of knowledge (Keller 1997; 2001; 2004a; 2004b; 2005a; 2005b). Keller suggests not only to focus on the language of discourses but rather to link the analysis of discourses to the social actors and groups involved in the production of discourses, relating the identified discourses to social, cultural and historical contexts in which they are found. Thus, the research presented in this thesis focuses on two sets of discourses: the arguments that the expert sources quoted in the coverage about the debate around Emmanuel College used and the statements of the interviewed media professionals about the production of newspaper content. Referring to Thompson's (1995) three elements of mass communication – production, content, and reception – this

methodological approach is consistent (Chapter 2; Section 2.3.1.). According to Keller (1997; 2001; 2004a; 2004b; 2005a; 2005b) it is important to investigate the manifestation of discourses (in this case the media content) and then the production of discourses (in this case media production) in order to find out more about how the content came into being.

In order to investigate the actors and groups involved in the production of discourses empirically Keller recommends making use of established methods of social and communication research. The research presented in this thesis examined two different sets of discourses. The first set is the discourse(s) of the expert sources and coalitions quoted in the newspaper coverage and the second set is the discourse(s) of media professionals involved in the representation of expert sources in newspaper accounts. An analysis of the second set could ideally contribute to a better understanding of the emergence and contexts of the first set and investigate if there are connections between the two. A study of media content and production processes in relation could therefore lead to additional insights that could not be gained through an isolated investigation of only one of these elements. An empirical approach that is able to set content and production in relation to each other is seen as more meaningful than approaches that examine these linked elements in isolation. However, this approach does not analyse all three elements of mass communication that Thompson (1995) recommends to study in relation as the ideal. Davis (1993) notes that investigating all three elements of mass communication can be very costly and highly complex if all three aspects are to be studied simultaneously. Here it should be noted that only a few studies of science in the media have analysed all three elements in the same study (for examples that have see Holliman, 2000; 2004 and Miller et al., 1998). It is also possible that an investigation of all three elements is less circumstantial than the detailed study of only two elements in relation. Therefore it was decided to focus on the media content element and the media production element in the controversy around teaching the theory of evolution and creationism in science classroom.

A set of social and media research techniques was combined to address this matter empirically. As a first step, a quantitative and qualitative study of newspaper content was conducted. A second step turned to the production side of newspaper accounts and used semi-structured interviews with journalists, reporters and specialist correspondents to investigate if and how the professional practice of journalists, reporters and special correspondents had an influence on the representation of expertise in this case study about teaching creationism alongside the theory of evolution in science classes.

## *3.2. Analysis of media content*

Studies of media content have been conducted from a range of disciplines with numerous theoretical and methodological approaches. It follows that there are various ways of approaching and examining media content (for overviews see Berger, 1998; Halloran, 1998; Hansen et al., 1998). This study used a quantitative and qualitative approach of analysing media content in investigating newspaper coverage. Newspapers were chosen since they are described as important social institutions which inform their publics about current cultural, political and social affairs (e.g. Allan, 2000; Richardson 2007) and have the potential to influence public opinion and decision-making processes (e.g. Nelkin, 1995). Compared to other news media such as television or radio they also have the advantage that they are already available in textual form and they are generally comparatively easily to access, e.g. through searchable electronic databases (Silverman, 2005).

The empirical design of this case study was informed by the literature on social and media research techniques and methods (Berger, 1998; Hansen et al., 1998; Jensen, 2002a; 2002b; 2002c; Flick, 2006; Silverman, 2005; 2006). Content analysis is an established quantitative method in communication research and combines various advantages. For instance, it is able to generate reliable data that can span large periods and it is also an

unobtrusive method (e.g. Krippendorff, 2004; Weber, 2004). Content analysis is one of the most frequently used methods in mass communication research (Hansen et al., 1998) and it aims at the systematic classification of communication content (e.g. Berger, 1998). For instance, Silverman (2006: 159) holds:

"Content analysis is an accepted method of textual investigation, particularly in the field of mass communications. In content analysis, researchers establish a set of categories and then count the number of instances that fall into each category."

However, content analysis has been criticized for only being able to deal with manifest elements of media content (e.g. Kracauer, 1952). Manifest content refers to the elements of media content that be directly counted (e.g. the word length of an article) and latent content refers to the elements of media content that have a certain meaning or allow a certain interpretation but cannot be directly observed. In order to investigate the latent dimensions of media content qualitative ways of content analysis can be conducted and certain concepts and categories must be developed in order to make latent content observable (e.g. Mayring, 2000). In the literature on communication research methodology it is often argued that the classification and analysis of media content is strongest if qualitative and quantitative approaches are combined and both, manifest and latent dimensions of media content, are investigated (e.g. Hansen et al., 1998; Konczal, 2000; Jensen, 2002a; Hesmondhalgh, 2006). This is one reason why the analysis of media content used in this study combines quantitative and qualitative approaches of manifest and latent content.

According to Silverman (2006) the study of texts through content analysis can analyse naturally occurring and accessible data which have real effects in the world. Berger (1998) describes content analysis as a research technique for the systematic classification and description of communication content according to predetermined categories. But according to Berger (1998) it is also important to remember that content analysis itself provides no direct data about the nature of the communicator, audience or effects.

Analyses of content analysis therefore cannot answer *why* questions about media content (Fiske, 1990).

Another problem is the interpretation of meaning of representations in media content (e.g. Hall, 1997). Analyses of media content alone can only shed light on what has been published, but what the published content means must be interpreted by the researcher or the audience of the newspaper and researchers and the audience might disagree about the meaning of the content (e.g. Hansen et al. 1998; Flick, 2006; Krippendorff, 2004; Richardson, 2007).

For Weber (2004) the central idea of content analysis is that the many words of a text are classified into much fewer content categories. Each category may consist of one, several, or many words. Words, phrases, or other units of text classified in the same category are presumed to have similar meanings. To make valid references to the text, it is important that the classification procedure is reliable in the sense of being consistent. Also, the classification procedure must generate variables that are valid. A variable is valid to the extent that it measures or represents what the investigator intends it to measure. The crucial decision one must make when conducting a content analysis is which categories to examine and how to find valid and reliable measurable units. The same applies for the development of concepts and categories that are designed for the investigation of latent media content in qualitative approaches to analysing media content (e.g. Mayring, 2000; Flick, 2006).

The quantitative and qualitative analysis of media content presented in this thesis investigated newspaper content and examined the amount and distribution of articles in newspapers, the types of articles; what kind of journalists and correspondents wrote the articles; and what the issues of the controversy were. It also investigated which expert sources were quoted in the newspaper coverage and what they were saying, how they were described and if there were any connections between the expert sources quoted in the sample.

### 3.2.1. Data collection: the pilot study

The empirical investigation was designed as an iterative process. Two phases preceded the main empirical investigation to initially develop the methods to investigate the research question that were set up in this thesis. These two phases informed the way the data was collected and analysed. Figure 3.1. outlines the timeline of the research.

**Figure 3.1.: Timeline of research**

| Year | Stage of Research |
|---|---|
| 2003-2004 | <u>Pilot Phase</u><br>• Hardcopy newspaper search of 10 newspapers from 29 November 2003 – 7 December 2003<br>• Systematic analysis of 66 newspaper articles of 18 newspapers from 1 January 2003 – 20 February 2004 using LexisNexis |
| 2004-2005 | <u>Quantitative and qualitative analysis of media content</u><br>• Systematic analysis of 287 newspaper articles of 20 newspapers from 1 January 2002 – 20 February 2004 using LexisNexis (this investigation subsumed the results of the previous phase) |
| 2005-2006 | <u>Production analysis</u><br>• Analysis of semi-structured interviews with seven media professionals |

Initially, data was collected over nine days; from Sat 29 November 2003 to Sun 7 December 2003. This initial sample was chosen to coincide with a seminar about

creationism and its implications for school science organised by the UK national newspaper *The Guardian.* The seminar was attended by the researcher and was titled "Creationism: Science versus Faith in Schools". It took place on 1 December 2003 at *The Guardian Newsroom* in London.

The sample included four national elite[9] newspapers and their Sunday editions (see Table 3.1. for the newspapers – regional/local newspapers have not been included in this sample). To spread the range of newspaper coverage two mid-market newspapers and the two popular newspapers and their Sunday editions were chosen to be part of the sample (see table 3.1.). In addition to the daily newspapers the issues of two weekly specialised publications on education, *The Times Educational Supplement (TES)* and *The Times Higher Education Supplement (THES)* were collected and reviewed on 28 November, 5 December and 12 December 2003. This range of newspapers was chosen in order to find out which types of newspaper reported the controversy.

The newspapers were sampled proactively in hard copy and searched by the researcher (Soothill and Grover, 1997). The results showed that only two articles in the sample were related to this debate. Both were published in *The Guardian.* As a result this sample was deemed insufficient and the sample period was extended.

A second investigation examined statements of expert sources in newspaper articles about the controversy around Emmanuel College teaching creationism and evolution in science classes using an extended sample, collected following electronic searches. The LexisNexis database was used to search newspapers from 1 January 2003 until 20 February 2004, inclusive, using the search terms "creationism" and "creation AND evolution" (the use of LexisNexis will be explained in more detail in Section 3.2.2., critiques of online searches will be dealt with in Section 3.2.3.). This investigation examined 66 articles (Allgaier,

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[9] A common way of distinguishing newspapers was by categorizing them as "broadsheets" and "tabloid" newspapers. However, since various newspapers of the elite and mid-market sector have adopted tabloid (and Berliner) size formats it makes more sense to distinguish "elite" newspapers from "mid-market" and "popular" newspapers (e.g. Richardson, 2007).

2004). The sample consisted of the same newspapers as the initial data collection activity (but did not include regional/local newspapers) (Table 3.2.).

Conducting this pilot study provided the researcher with an overview of the debate. The results of the pilot investigations also pointed to the need to extend the sample period further in order to gain a more comprehensive picture of the controversy about teaching creationism and the theory of evolution in science classrooms. Through the investigation of newspaper articles from the year 2003 it was also found out that the debate around Emmanuel College emerged in January 2002 and that the following extended main newspaper sample needed to include the previous year (2002).

### 3.2.2. Data collection: the main study

The main newspaper sample of this study subsumed the previous phases of the research and used the same sample of newspapers, but added two regional/local newspapers and extended the sample period. As a result it included four British quality national[10] newspapers and their Sunday equivalents; a further two were British mid-market tabloids and their Sunday issues, and two British popular newspapers and their Sunday issues. Furthermore, two British weekly publications specialised in education issues and two regional/local newspapers from the North of England were included in the sample (see Table 3.2.).

The sample was designed to represent a broad range of various types of newspapers. Newspapers differ, for instance, in the circulation figures and the audiences they reach but also in the way they use language, illustrations and layout (Steward et al., 2001; Richardson, 2007). Also the political stances of newspapers can vary but often voices with different points of view are represented in newspapers as well (for further information on

[10] On the difficulty of classifying newspapers available in the UK in national terms see MacInnes, et al. (2007).

the political stance of UK newspapers and ownership issues see McNair, 1999; 2004). Here it was assumed that the different editorial stances and types of newspapers could have an influence on how the debate around Emmanuel College was reported.

Various newspapers were therefore selected in the sample to address the research question which newspapers represented the debate and whether there are differences in the distribution of articles, amounts of coverage and the way expertise is represented in the coverage of the controversy around teaching the theory of evolution and creationism. Eight of the newspapers and their Sunday equivalents included in the sample were national newspapers.

**Table 3.2.: The newspapers in the print media sample, grouped by 'type' of newspaper**

| **Type of Newspaper** | **Name of Newspaper** | |
|---|---|---|
| **Elite Newspapers** | *Daily Telegraph* | *Sunday Telegraph* |
| | *The Times* | *The Sunday Times* |
| | *The Guardian* | *The Observer* |
| | *The Independent* | *The Independent on Sunday* |
| **Mid-market Newspapers** | *Daily Mail* | *Mail on Sunday* |
| | *Daily Express* | *Sunday Express* |
| **Popular Newspapers** | *The Sun* | *News of the World* |
| | *Daily Mirror* | *Sunday Mirror* |
| **Regional/Local Newspapers** | *The Journal (Newcastle)* | |
| | *The Northern Echo (Darlington)* | |
| **Newspapers specialised in Education** | *Times Educational Supplement (TES)* | |
| | *Times Higher Education Supplement (THES)* | |

Coverage of national and regional newspapers can differ and journalists working for the regional/local media often have priorities that are different from those of the national media (e.g. Aldridge, 2007). In order to compare the national coverage with that of

regional/local publications *The Journal* (published in Newcastle) and *The Northern Echo* (published in Darlington) were included in the sample. The controversy around teaching the theory of evolution and creationism revolved around one particular school in Gateshead upon Tyne, in the area of circulation of these two newspapers.

In addition to the daily newspapers the issues of two weekly specialised publications on education, *The Times Educational Supplement (TES)* and *The Times Higher Education Supplement (THES)* were added to the sample. These were included since the debate about teaching creationism and the theory of evolution had special implications for educational practices and policies and therefore it was assumed that relevant coverage could also be found in there.

The sample period for the main study was from 1 January 2002 until 20 February 2004 (date the first sample was drawn), inclusive of the data collected for the pilot study. Initial research (see 3.2.1.) on the debate around Emmanuel College indicated that the debate was first reported in the UK press in January 2002 and many of the particularly significant events took place in Spring 2002. Further database searches before this period did not yield any results referring to the controversy around Emmanuel College.

The online newspaper-archive LexisNexis[11] was used to carry out searches. Electronic sampling tools and methods of newspapers have the advantage that they provide systematic and reliable ways of sampling newspapers. Searches of actual newspaper copies "by hand" are too time-consuming to be carried out over a longer search period and electronic searches allow for extended searches of a larger number of newspapers (see also Soothill and Grover, 1997; Krippendorff, 2004).

The LexisNexis database contained all of the newspapers selected in the sample. The LexisNexis search among "UK News – newspapers only" was carried out using the search term "creationi!" (the exclamation mark initiates a wildcard search – the "i" was included

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[11] For further information about LexisNexis see their homepage: http://www.lexisnexis.com/ (last checked 21 February 2007).

because the term "creation" generated a significant number of irrelevant articles). Other and different search terms (e.g. "creation/evolution controversy" or "evolution AND school" etc.) were tried before but the search term "creationi!" led to most significant results about articles referring to the controversy about teaching creationism and/or the theory of evolution. The results generated by using other search terms also came up by using the search term "creationi!".

After the use of the search term "creationi!" results from newspapers that were not included in the sample came up. The list of results therefore had to be checked result by result to find out whether the individual articles where published in the newspapers selected in the sample. Only articles that were published in the newspapers included in the sample were selected as data investigated in the study.

The next step was a process of filtering that was conducted to sort out all the articles that included the search term, but did not relate to the story around creationism and the theory of evolution. For instance, a feature article about the comedian Bill Hicks in *The Independent* came up as a search result since it contained the term creationism in the following sentence:

> "He would hold up for scrutiny the scary revisionist mindset of the *creationists*, the hypocrisy of government, the "non-miracle of childbirth", and he would bring them into sharp focus."
> (Baily, 2004, February 12: 3, emphasis added).

This was the only reference to the controversy around creationism in this article and the article was therefore excluded from the sample. This selection process was straightforward and in all cases it was clear after one reading of the article if it should be included in the sample or not. Once the two filtering processes were complete the remaining articles formed the corpus for the further analysis.

### 3.2.3. Criticism concerning online searches

Various communication researchers, such as Krippendorff (2004) or Soothill and Grover (1997), have questioned whether a computer search on newspapers and print-outs of the stored text bodies is sufficient to fully examine media coverage in newspapers. Krippendorff (2004) and Soothill and Grover (1997) argue that whilst computer searches of newspapers are often appropriate, there are problems with the technology (such as LexisNexis). Using online newspaper searches, one needs to recognise that particular data will be lost. In particular, the relationships between graphics, the spatial location of stories (what stories are printed on the same page and how are they related) and the accompanying text are not discernible from online output. Moreover, Kaufman et al. (1993) have found that newspaper publishers sometimes upload another edition of the newspaper than the final issue that was published in print in the electronic archives and full text databases. This, so they argue, could affect the reliability of electronic newspaper searches. To avoid overlooking stories they recommend that researcher(s) persist in using various search strings to find all relevant stories. Furthermore, researchers may choose to analyse sub-samples of hardcopy newspapers.

In order to guard against these problems and to increase the validity and reliability of the sample the use of computer searches of newspapers were supplemented with visits and searches at the Newspaper Archive of the British Library in Colindale, North-West London[12]. There the microfiche archives of the relevant publications of the sample period were searched to avoid omissions and to compare the articles retrieved from the online sample with the ones of the newspaper archive. In order to do so a list of 35 articles that reported key events in the controversy was identified and photocopies of these articles were made. These were compared with the articles retrieved from the online archives and

[12] More information on the Newspaper Archive of the British Library can be found online at: http://www.bl.uk/collections/newspapers.html (last checked 20 February 2007).

no differences were found. Further comparisons of online newspaper content and the hardcopy newspaper library were made using four sub-sets of the overall sample. The microfiche archive was used to search the archive of two popular and two mid-market newspapers included in the sample in Spring 2002 but no further articles relating to controversy around teaching creationism and the theory of evolution were found.

The quantitative and qualitative analysis of media content in this study focused on textual representation of expert sources and what they were saying in the debate around teaching creationism and the theory of evolution and the relationships between graphics and the spatial placement of the articles were not part of the analysis. It was therefore concluded that the newspaper content retrieved from the LexisNexis database, checked for reliability through visits at the British Library Newspaper Archive, formed a representative sample of the newspaper coverage of the controversy from 1 January 2002 to 20 February 2004. By the end of the data collection process the text from all articles included in the sample was available as print-outs and in digital form.

### 3.2.4. The quantitative investigation of media content

As a first step the print-outs of all articles were analysed in chronological order and notes were taken about events, issues and actors emerging in the coverage during the sample period. This step served to gain an overview of the data material and the chronological developments in the controversy. The analysis of the articles paragraph by paragraph also served to distinguish articles that were completely relevant (if the whole article related to the controversy around evolution/creationism) and articles that were only partly relevant (e.g. if the controversy around creationism/evolution was mentioned in only one paragraph of an article and the rest of the article was about another topic). Articles that were completely relevant to the study were included fully in the further process of analysis. Where articles were only partly relevant to the topic of the study only the relevant

paragraph(s) of the text was included in the further research process. The paragraphs that did not relate to the controversy were dropped and were not included in the further processes of investigation.

For instance, in an article about an education expert written by the journalist McCann (2002, April 18) the education expert talks in one paragraph (five lines in this article) about how she feels about the teaching of creationism. The rest of the article was about matters that did not relate to the controversy. As a result only the five lines of the article that related to the controversy were included in the further analysis, but a note on the coding sheet summarised what the whole article was about and in what context the statement was made. The outcome of this process determined the relevant content of the content analysis (see Hansen et al., 1998).

After this step was completed a comprehensive coding schedule (see Appendix 3.1.) was developed. This coding schedule was used to investigate distributions of manifest and latent content in the newspaper articles. Section 3.2.4.a explains the categories that were set up for investigating the manifest content; Section 3.2.4.b. explains the treatment of bylines; Section 3.2.4.c. describes the dimensions that were set up to categorise the types of articles and Section 3.2.4.b. describes the dimensions that were set up to categorise the different types of expert sources in the newspaper articles.

3.2.4.a.) *Categories of manifest content*

Table 3.3. shows eight identifier categories that were set up in the coding schedule for the analysis of manifest content.

The coding schedule was used to determine the quantitative distribution of variables in the newspapers articles in the sample. The coding was done by the researcher alone. The coding schedule was piloted and revised to determine its accuracy using a smaller sub-sample of the articles (see Hansen et al., 1998).

**Table 3.3.: Categories of the coding schedule for manifest content**

| Category | Description |
|---|---|
| **Date** | Date the article was published |
| **Newspaper** | Name of the newspaper the article was published in |
| **Headline** | Headline of the article – taken verbatim from article |
| **Byline** | Bylines of the article that indicated eventual specialism of the author of the article – taken verbatim from article (if listed), see Section 3.2.4.b. |
| **Author of Text** | Name of Journalist/Special Correspondent that wrote the article – taken verbatim from article (if listed) |
| **Section of Newspaper** | Part of the newspaper the article had been published in, e.g. home news or opinion pages – taken verbatim from article (if listed) |
| **Length of Article in Words** | Number of words of the article – taken verbatim from the LexisNexis result page |
| **Countries the article refers to** | United Kingdom / USA / United Kingdom and USA / United Kingdom and other country than the USA / Other Country |

In practice, the accuracy of the coding schedule was tested with 35 articles to see whether the coding schedule was able to account for all the categories and dimensions set up in the schedule or if something was overlooked or left out. One minor modification was made in order to optimise the schedule before the coding process started again with all newspaper articles, including the ones used to pilot the schedule: It was found out that the category of countries the articles referred to needed one further dimension that indicated that an article can refer to the debate in the UK *and* in another country than the USA.

The next step in the coding process was a second analysis of the articles and the specification of the variables that were noted in the coding schedule document for each article. At the end of the coding process each article was numbered and was assigned a

sheet of the coding schedule. The further quantitative analysis was carried out based on the sheets of the coding schedule that were assigned to each article.

3.2.4.b.) *Bylines*

The variable byline needs further explication. Additional dimensions were also set up for the variables "type of article" and "expert quoted in the sample" which will be described below. All three variables and their dimensions were included on the coding schedule (Appendix 3.1.).

The distribution of bylines was used to distinguish the specialisms of the journalists and correspondents that wrote news reports about the controversy (see Chapter 5, Table 5.1.).

The variable "byline" was supplemented with an entry "specialised in education" for all authors of news reports that appeared in the *Times Educational Supplement* and the *Times Higher Education Supplement.* In all other cases the bylines were taken verbatim from the articles. A consequence of this way of analysing the specialism of media professionals was that if a specialist correspondent had written a news report in the sample but no byline was added indicating their specialism the author was classified as having no specialism. It is therefore possible that more specialist correspondents reported the debate than indicated in the bylines. Once the specialism of the writers was categorized specific articles written by the specialist correspondents could be searched and compared. The distribution of bylines that served to indicate the specialism of the authors of news reports is presented in Chapter 5, Section 5.1.; and the distribution of expert sources quoted by specialist correspondents is presented in Chapter 5, Section 5.2.4. The results of this analysis also informed the recruitment process of the media professionals for interviewing purposes.

The further sections will describe the dimensions that were used to investigate the latent content that was investigated using the coding schedule.

3.2.4.c.) *Types of articles*

Different types of newspaper articles represent events in different ways. News reports are written by reporters and specialist correspondents and are supposed to report events objectively. Comment articles and editorials generally contain the opinion of media professionals and others and analyse the meaning of news events from a particular point of view. Letters to the editors are written by the readers of newspapers and represent their (collective) point of view. In order to find out which types of articles were published reporting the debate around Emmanuel College the types of articles needed to be qualified. The analytical dimension of "type of article" was therefore classified in five categories. These were "News Reports", "Comments", "Letters", "Book reviews" and a residual category "Others".

The dimension of *news report* included all press accounts of the controversy and articles that reported events and developments without commenting on the debate (see Steward et al., 2001). The dimension *comment* included all comments and opinion pieces appearing throughout the newspapers, such as editorials and leader articles or ironic and satirical sketches by writers of the newspaper or guest commentators (see also Steward et al., 2001). Whether an article was a "news report" or a "comment" was partly judged by the section in the newspaper in which they appeared. News reports generally appear in the national and international news sections and comments in the opinion and comment section. However, this was not always the case. In cases where the section was not given or unclear a further way of distinguishing between "news report" and "comment" was applied: If the writer of the article included value judgements about the debate (e.g. whether something was "right", "wrong", "amoral" or "hypocritical") that could not be related to sources quoted directly or indirectly in the article the article was coded as "comment". Furthermore, if the author was a regular columnist then the article was coded

as "comment". If the events or controversy was reported without manifest value judgements the article was coded as "news report".

The category *letters* contained all articles that were clearly marked as letters (or emails in that regard) to the editors. These were generally published in a particular letter section in the newspapers and often included a formal opening line and geographical information on the sender of the letter (or an email address).

The analysis of the articles also showed that the debate around the theory of evolution and creationism was also addressed in books that were reviewed during the sample period. Some reviews of books about this topic also referred to the controversy around Emmanuel College in Gateshead. Therefore the category *book reviews* was included to be able to classify all the book reviews that were relevant for the coverage about the controversy.

The residual category *other articles* was set up for the articles in the sample that could not be classified along any of the other categories. These were, for instance, corrections or clarification articles or obituaries.

### 3.2.4.d.) *Types of expert sources*

The quantitative investigation of expert sources was designed to determine the distributions of expert sources in the sample. The qualitative examination of the statements and description of expert sources used the same dimensions of expert sources in order to make consistent comparisons and statements and will be described in Section 3.2.5.b.

Based on recent discussions that have challenged narrow definitions of experts, and seen a blurring of the boundaries between experts and citizens (Chapter 2; Section 2.1.1) a broad notion of the term expert source was adopted in this investigation. For instance, Limoges (1993) sees all actors involved in a controversy as equally relevant actors and recommends to use a symmetrical approach in studying expertise in which none of the actors is

privileged in terms of expertise or expert status (on symmetrical methodological approaches see also Kendall and Wickham, 2003).

The research presented in this thesis is interested in the question of who counts as an expert source or is seen as having expertise in newspaper representations of the debate around Emmanuel College. From to the point of view of the media professional each of these individuals or institution must contribute something to the debate that is interesting or relevant enough to be reported and all of the quoted individuals and institution need to be selected along various criteria of professional practice (which will be investigated in Section 3.3.). Therefore every individual or institution that is quoted directly in news reports, comments, book reviews or other articles (but not in the letters since they were written by the readers) is granted some form of expertise and is treated as an expert source in this research. (Letters were analysed separately.)

Subsequently, an expert source was counted as quoted in the coding process when there was at least one direct quote in an article. The unit of analysis was the quote of the expert in inverted commas. Several direct quotes by one expert each counted once in the coding scheme. The length of the quotes in one article were not distinguished – the focus was on who it was that had been quoted, what they were saying and how they were described.

So it was possible, for instance, that one article contained the view of an individual scientist and another made on behalf of a scientific organisation, several quotes from a teacher from a particular school, one from a bishop and a statement made by an educational authority. The coding schedule for this article would then state that five experts were quoted; that is two scientific experts, one educational expert, one religion expert and one political expert (the education authority).

In the piloting phase of the investigation seven exploratory dimensions of expert sources (scientific and educational professionals; religious experts, politicians and authorities; NGOs and activists; parents and/or pupils; other experts) were set up intuitively to test their accuracy. A further analysis of the articles in the subsequent main sample revealed

that media professionals (an expert dimension that was missing in the piloting phase) were also quoted also in the main sample – so "media professionals and organisations" was subsequently added as another dimension. As a result eight categories were used to classify the quoted experts in the sample. These are listed in Table 3.4.

**Table 3.4.: Dimensions of expert sources quoted directly in newspaper articles**

| **Dimension of expert sources** | **Description** |
|---|---|
| **Scientific experts, organisations and institutions** | Contains all the quotes by actors described as scientists or on behalf of scientific institutions and organisations. |
| **Educational experts, organisations and institutions** | Contains all quotes by teachers, educators and schools' staff or on behalf of educational organisations, e.g. such as teaching unions. |
| **NGOs, campaigners and action groups** | Contains all quotes from individuals representing or on behalf of NGOs, action groups, charities or promotion groups of particular worldviews, e.g. secular or creationist groups. |
| **Politicians, authorities and other officials** | Contains all quotes from politicians, representatives of political parties but also from authorities such as the Department for Education and Skills or the education inspectorate OFSTED. |
| **Religious experts, texts and institutions** | Contains all quotes from representatives and spokespeople of religions and churches, as well as individual clergywomen and clergymen. The Bible had also been quoted directly in the sample and was categorised as religious text. |
| **Media professionals and organisations** | Contains all quotes from media commentators, journalists, reporters and correspondents or from people speaking on behalf of media organisations or if another article in a newspaper is quoted without giving the name of its author, for instance in the line "a British Sunday newspaper wrote:…". |
| **Parents and/or pupils** | Contains all quotes by pupils, students and parents of schoolchildren. |

| | |
|---|---|
| **Other experts** | Residual category that contains all quotes that could not be categorized along any of the other categories. |

One of the challenges in coding expert sources in this way is what Star (1991) calls "multiple memberships" of social actors in various social groups. The methodological solution to this problem was that if expert sources were described in a way that they could potentially be fitting in more than one expert category (if categories of an expert source overlapped, e.g. a teacher who is also a parent) what they were saying in the quote was determining for the dimension of experts in which they were categorized (e.g. if the teacher who is also a parent talks about concerns about his/her own children being indoctrinated s/he was classified as parent) (see Holliman, 2000). This occurred in only three cases. The coding of expert sources in expert categories therefore generally followed the descriptions of the authors of the articles.

Creationist and humanist or secular groups were coded in the category NGOs and campaigners since they have diverse memberships and address different issues concerning religion, science or education. This is why these organisations were not coded as expert sources of any other category. Spokespeople from creationist organisations addressed, for instance, the scientific validity of religious accounts, and educational and religious issues. Secular and humanist groups also addressed various issues. Both, creationist and humanist and secular groups are campaigners for a particular world-view rather than having expertise in a certain subject matter, this is why they were coded in the NGOs and campaigners group. Also, the spokespeople of parents' action-groups were coded in the NGO category since they represented an action group that came together to campaign for or against a particular issue in the debate around Emmanuel College. Consequently, all further action groups that have been quoted in the debate around Emmanuel College were coded in this category. Furthermore, all of the quoted expert sources in the sample could be

coded in one of the seven expert categories and no expert source needed to coded as "other expert". This residual category will therefore be neglected in the presentation of the results. Once completed, the coding schedule facilitated searches across variables and could be used to examine correlations between variables, for instance if one wanted to have a closer look at the distribution of expert sources in articles written by science or educational correspondents. The quantitative results and the distribution of articles and the distribution of types of articles are presented in Chapter 4, Section 4.1., the distribution of quoted expert sources is presented in Chapter 4, Section 4.3., the distribution of bylines that served to indicate the specialism of the authors of news reports is presented in Chapter 5, Section 5.1.; and the distribution of experts quoted by specialist correspondents is presented in Chapter 5, Section 5.2.4.

### 3.2.5. The qualitative investigation of media content

Initially, the qualitative investigation was based on the ideas and recommendations of Engelhardt and Caplan (1987) (Chapter 2, Section 2.1.2.). They argue for the establishment of "geographies of controversies" as a way of mapping controversies. This process works in two steps. First the various issues of a controversy need to be distinguished, explained and categorized (Section 3.2.5.a.). The second step is to identify the expert (sources) involved in the controversy and categorize them (Section 3.2.5.b.).

#### 3.2.5. a.) *Identifying the issues of the controversy*

In order to identify the issues of the controversy different types of qualitative analyses were employed. The rationale of this research step was to introduce the different issues of the controversy that were reported in the newspaper articles. The results from this analysis are not the main purpose of the empirical research but they are an important initial step in

order to introduce and understand the statements of the quoted expert sources better, in what context they were quoted and which issues they were referring to in their quotes. This analysis investigates trends in the reporting of various issues related to the controversy around Emmanuel College in the newspaper articles and was informed by the results of the analysis that established the chronology of events. It was difficult to quantify the number of different issues, since many of the newspaper articles referred to various issues at the same time and often these issues were interwoven. Instead an inductive approach was adopted in order to establish categories for issues that were reported regularly in the newspaper articles about the controversy.

To be able to analyse the issues of the controversy in the newspaper articles they must first be identified, selected and isolated from the newspaper articles in a process of working through the articles systematically and employing open, axial and selective coding of the items one is looking for.

- The purpose of *open coding* is to develop categories and themes based on the data in an inductive process that involves the interpretative work of the researcher (e.g. Flick, 2006; Silverman, 2005; 2006).
- In *axial coding* processes one looks for connections between categories that have already been set up and tested in the research process (e.g. Flick, 2006; Silverman, 2005; 2006).
- In later stages of the research process *selective coding* is used to selectively isolate passages that illustrate or illuminate previously identified concepts (e.g. Flick, 2006; Silverman, 2005; 2006).

However, in practice it is difficult to distinguish the three different coding strategies. Flick (2006) describes this process the following way:

"In the process of interpretation, different "procedures" for working with text can be differentiated. They are termed "open coding," "axial coding," and "selective coding". You should see these procedures neither as clearly distinguishable procedures nor as temporally separated phases in the process. Rather, they are different ways of handling textual material between the researchers move back and forth if necessary and which they combine. [...] Coding here is understood as representing the operations by which data are broken down, conceptualized, and put together in new ways. [...] According to this understanding, coding includes the constant comparison of phenomena, cases, concepts, and so on and the formulation of questions that are addressed to the text." (Flick, 2006: 296).

In order to distinguish the various controversial issues of the controversy around creationism and the theory of evolution a set of general inductive categories were set up (Table 3.5.). These categories were based on the notes taken in the analysis that established the chronology of events, using a open coding strategy. For instance, while initially analysing the articles it emerged that the story about teaching creationism was related to the particular school type of Emmanuel College. In the following coding process of all articles all references to the type of school (e.g. City Technology College, City Academy or privately sponsored school etc.) in the articles were extracted and collected in a new separate document for further analysis. This step is a selective coding process (Flick, 2006). Using the category "school type" each article was worked through sequentially sentence by sentence looking for references to the school type of Emmanuel College. In this process the unit of analysis was the sentence that contained references to the type of school. These sentences could also contain quotes of expert sources speaking about the type of school. Once one or several sentences were found in an article referring to the type of school these sentences were copied and pasted into a blank document collecting all the sentences referring to the type of school including the number of the article from which the sentence or sentences were taken. This selective coding process was applied to 13 categories that were developed from the notes taken in the first research step of the qualitative analysis. Often several of these categories could be found within a single

article. Table 3.4. lists the categories of issues that were used in this step of the qualitative analysis.

**Table 3.5.: Categories used to classify the issues of the controversy**

| Category | Description |
|---|---|
| **Type of school** | All sentences that referred to the type of school of Emmanuel College, for instance City Technology College; City Academy. |
| **OFSTED (Office for Standards in Education)** | All sentences that referred to the education inspectorate, for instance, OFSTED report or OFSTED inspections. |
| **Curriculum** | All sentences that referred to curriculum issues, for instance about the National Curriculum; the science curriculum. |
| **Creationism/Creationists** | All sentences that referred to creationism or creationists, for instance Biblical creation; young-earth creationists. |
| **Evolution/Science** | All sentences that referred to the theory of evolution or science more generally; e.g. natural selection; experimentation; biology. |
| **Sponsoring** | All sentences that referred to sponsoring or donation of money, for instance sponsoring of schools, sponsoring of research. |
| **Multicultural/Multi-faith society** | All sentences that referred to aspects of the controversy that related to multicultural or multi-faith societies, for instance Muslim or Hindu accounts of creation. |
| **Government** | All sentences that referred to the involvement of the government or governance or the opposition of the government, e.g. Labour Party; Prime Minister; Cabinet. |
| **Globalisation** | All sentences that referred to international developments or links between the controversy in the UK and other countries, e.g. creationists from the USA reacting to the debate in the UK. |
| **Creationist Conference** | All sentences that referred to a creationist conference held at Emmanuel College. |

| | |
|---|---|
| **Scopes Trial** | All sentences that referred to the Scopes Trial in Tennessee in 1925 in which the teacher John Scopes was prosecuted for teaching evolution in school. |
| **Faith in Education** | All sentences that referred to the role of faith in education more generally, for instance faith schools; praying in schools; selection and separation of pupils by faith, etc. |
| **Relativism** | All sentences that referred to issues of postmodernism or relativism. |

The outcome of this process provided 13 new documents that collected all the sentences referring to the category the document was named after. These documents served to gain an understanding of the different controversial issues of the controversy. In this way it could be found out what the different categories had in common or if some of these initial categories were overlapping with other categories. As a result some of the categories were collapsed, for instance, the category sponsorship (in education) in the sample fell together with the category of school type (City Technology Colleges are privately sponsored schools). Categories that were mentioned less than five times were dropped. For instance there were only three references to the Scopes Trial.

This step led to the identification of a few major issues of the controversy that were frequently mentioned in the newspaper articles and a couple of smaller issues that are related to the controversy. The results of this analysis are presented in Chapter 4, section 4.2.

The heuristic examination of the issues of the controversy also served a second purpose. Once the statements of the quoted experts were examined (see Section 3.2.4.b.) the documents created in order to examine the issues of the controversy could be used to cross-examine the results of the analysis of expert statements and discourses. These documents were then taken as the basis for an axial coding process (Flick, 2006) that looked for connections between issues and statements of expert sources. This way it could be checked

whether the results of the analysis of the statements of the quoted expert sources matched the categories of the issues of the controversy.

3.2.5.b.) *Examining expert source statements and descriptions*

Section 3.2.3. described how the distribution of expert sources was quantified. However, determining the quantitative distribution of expert sources in newspaper articles does not shed any light on about the expert sources were saying in the coverage and also which of the different controversial issues of the controversy they were addressing in their quotes. Therefore a qualitative approach was adopted that examined what the quoted expert sources had to say in the coverage and also the way they were described in the newspaper articles.

For consistency the same eight dimensions of experts (Table 3.4.) were used in the qualitative investigation that examined the statements by expert sources and descriptions of experts quoted in the sample.

The unit of analysis in this step was the quote of the expert source in inverted commas. In a first step all direct quotes were coded according to the categories of expert sources (Table 3.4.). A document was created for each of the expert categories. In this step the descriptions of the expert sources, institutions or organisations that were quoted were also coded along the same expert categories. These were generally to be found in one or two sentences preceding or following the quote. However, longer articles with several quotes by the same expert source also had descriptions of the expert sources in other parts that were also extracted in the coding process. Descriptions of expert sources were coded in whole sentences, that is, all sentences that contained descriptions of the expert sources were included in the analysis. Both the quotes and the descriptions of the quoted expert sources were extracted and pasted with the number of the article into a new document stating the expert category.

The outcome of this coding process were seven separate documents (no expert sources were coded in the residual category "other experts") that contained all the direct quotes and descriptions of expert sources and the number of the article in which they appeared. These documents provided the data basis for a further coding process of "open coding" (e.g. Flick, 2006) in which the statements by the various experts could be analysed in relation to the other quotes from experts of the same expert category. In the case of the quotes of the experts similarities and differences in the arguments of the expert sources of the same category were investigated and also if there are similarities and differences in the use of language. This research step was designed to find out more about the statements of quoted expert source. Here it was of interest if the quoted experts of the same category all addressed the same or different issues of the controversy; if they used the same or similar arguments in addressing the various issues of the controversy; also if expert sources of the same category used language and rhetoric in a similar way.

Different arguments about different issues could be identified in all of the expert categories but in one case also a common use of language that was employed by the expert sources of the same expert category could be identified. The results of this step allowed further distinguishing and categorizing the expert sources of the same category of experts and differentiating them by the issues they addressed and the argumentation lines they used.

However, the numbers of quotes in four expert categories (politicians, authorities and other officials; religious experts, texts and institutions; pupils and/or parents; media professionals) were too small to establish categories to group them together (Chapter 4; Sections 4.3.5. – 4.3.8.). As a result it was only possible in three expert categories (scientific experts; educational experts; NGOs, campaigners and action groups) to categorize the arguments the expert sources made (Chapters 4; Sections 4.3.2. – 4.3.4.).

In order to examine the descriptions of the expert sources a scale was set up that ranged from enhancing the credibility of the expert source (e.g. a description as "leading expert" of the expert's field) to neutral descriptions (e.g. the school's head teacher) and to

descriptions challenging the expert sources' credibility (e.g. indication that an expert is paid by somebody in order to say something the expert would not say otherwise). However, many descriptions of expert sources were ambiguous in their meaning and it was therefore problematic to classify them unequivocally as having enhancing or challenging effects on the credibility of the expert sources.

For instance, concerning the description of the scientific expert Richard Dawkins as "an ultra-Darwinist and professor of understanding of science[13] at Oxford University" (Hackett and Waterhouse, 2002, March 17), it depends on the reader's point of view on the issue whether this description makes this scientific expert sound more credible or if it challenges the credibility of this expert source. The ambiguous cases will therefore be presented together with examples of descriptions that enhance and challenge the credibility of quoted experts more clearly. The results of this part of the analysis are presented in Chapter 4, Sections 4.3.2. – 4.3.9.

3.2.5.c.) *Identifying connections between experts*

It was also found in the pilot phase of the research (see Section 3.2.1.) that connections between some of the expert sources in the controversy around Emmanuel College were reported in the sample. For instance, there were a couple of news reports about various expert sources signing petitions related to the controversy. Also the recent literature on experts and (scientific) controversies (see Chapter 2, Section 2.1.1.) suggests that experts do not necessarily appear in isolation in controversy contexts and that networks of and coalitions between experts (and laypeople) are an important factor of experts' strategies of winning influence (e.g. Limoges, 1993; Irwin and Michael, 2003). Therefore a further qualitative approach was adopted. Newspaper articles were checked systematically in

[13] The correct term is „Professor for the Public Understanding of Science", the world "public" has been left out in the description of the expert in this article.

terms of connections between the quoted expert sources. All types of articles were included in this process, including the letters because some of the experts wrote letters themselves or were co-signatories in commonly drafted letters. A selective coding strategy (Flick, 2006) was therefore employed to filter out all the sequences referring to connections between expert sources. The unit of analysis in this qualitative analysis was the individual sentence that referred to connections between expert sources quoted in the coverage. Each sentence that referred to connections between expert sources was extracted and pasted into a new document that collected the numbers and sequences of all articles that referred to connections between actors. This new document provided the basis for a further "open coding" process (Flick 2006) that was chosen for the development of further categorisations and themes of the connections between the quoted experts.

A resulting categorisation in three broad groups was based on what the expert sources were arguing for, what kinds of issues their arguments concerned, what common aims the expert sources had and whether expert sources formed specific actions groups concerning particular issues of the controversy around teaching creationism alongside the theory of evolution in science classes. The results of the analysis of the issues of the controversy (Section 3.2.5.a.) and of the analysis of statements of expert sources (Section 3.2.5.b.) could then be used to cross-validate the emerging categorisation of connections between expert sources with the results of the statements of quoted expert sources and of the issues of the controversy. The results of this part of the analysis are presented in Chapter 4, Section 4.4.

In summary, in the process of the qualitative analysis of newspaper content every article (apart from the letters) was investigated through a systematic method of analysis at least three times. The emerging categories and concepts in one of these steps could in this process be compared with and referred to the emerging concepts and categories of the other two steps. This triangulation strategy (e.g. Flick, 2006) was employed in order to increases the reliability and validity of the developed categories and concepts. However,

qualitative coding and the development of categories and concepts that are based on empirical data are outcomes of the informed interpretative work of the involved researcher (e.g. Keller, 2004). The development of categories and concepts based on qualitative data analysis is not an easy and straightforward process and generally has difficulties attached (see Silverman, 2005; 2006). In the case of this research it was necessary to move back and forth through the data to compare categories with other concepts and adjust, modify and fine-tune the categories and concepts in order to be able to account for cases that did not fit categorisation easily. In this regard the handling of and the interpretation of the data was an iterative process and was not complete when one of the research steps was accomplished. Rather, (preliminary) results of one of the three steps used in the qualitative data analysis of media content could also influence the treatment of other steps.

Comparing the results of three different qualitative analyses of media content potentially increased the overall validity of the results. However, the sample and the sample period are limited. Furthermore, the introduction of coder reliability measures would also improve the reliability of the results (e.g. Hansen et al., 1998).

## *3.3. Investigation of the production side of media content*

The first part of the empirical research that investigated the newspaper content about the controversy was combined with a second part that investigated production processes. There are several ways of studying media production processes. For instance, ethnographies in newsrooms as participant observers (e.g. Hansen et al., 1998) was the approach that Tuchman (1972; 1973; 1976; 1978), Gans (1979) and Schultz (2007) adopted to study media production processes. However, this approach can only examine media production processes that are happening while the observer is present but cannot be conducted in retrospect. In this sense this approach could not illuminate how professional practice might have affected the selection of expert sources in the controversy around Emmanuel College.

Another method that could be adopted would be the use of questionnaires (e.g. Moser and Kalton, 2004) sent to the media professionals that produced newspaper articles about the controversy around Emmanuel College. One problem here is that media professionals might not have the time and interest of completing and returning the questionnaires. Another problem in this approach is that fixed-choice questionnaires do not allow the respondents to answer the questions in their own words and that the given fixed answering option might miss the point of what the media professionals would like to express or address (e.g. Cicourel, 2004). As method fixed-choice questionnaires were seen as not being flexible enough to investigate media production processes from the point of view of the media professional. Answering open questionnaires in writing might also take too much time to be completed by busy media professionals.

Semi-structured interviews with journalists were therefore chosen to illuminate the working practices of media professionals in producing newspaper accounts of the controversy. This method allows the respondents to answer questions in their own words and semi-structured interviews are also flexible enough to react reflexively to particularly interesting statements the respondent made during the interview (see Section 3.2.2.).

The interviews were conducted to provide additional data in order to illuminate production processes. This data complements the results of the content analysis. The interviews with media professionals were designed to establish the point of view of the media professionals and how their professional practice might have influenced the representation of expert sources in the debate in the newspapers. Qualitative interviews can provide "rich" and "deep" data (Gomm, 2004; Gray, 2004). Data on the production of newspaper accounts of the controversy around Emmanuel College could not be obtained from archives or other secondary sources. In order to analyse the authentic view of media professionals it was therefore crucial to interview the media professionals themselves.

### 3.3.1. The production sample

The aim of the production analysis was to interview journalists that reported the controversy in the newspapers included in the sample of this study. Therefore a list – based on the results of the quantitative content analysis (see Section 3.2.4.b.) – was compiled, which stated the authors that wrote news reports concerning the debate in the sample period. A range of different strategies was employed to recruit media professionals for interviews. More than 60 media professionals were contacted initially by letter, later also by using email and telephone. Some of the journalists that had written many of the articles in the sample were contacted more than once.

The response rate was low. Seven journalists agreed to be interviewed (one correspondent specialised in education news was found through a recommendation from a colleague). The sample is too small to provide a completely reliable account on newspaper production in the controversy around Emmanuel College. Nonetheless, the interviews with media professionals can still provide valid "snapshot" insights about the professional practice of these journalists.

The difficulty of recruiting media professionals for interviewing purposes has also been noted in other studies. For instance Cook et al. (2006: 16) note:

> "Lack of cooperation by journalists reflected perhaps both professional pressures, and a preference to interview rather than be interviewed."

Seven interviews with media professionals were conducted in the period from 13 October 2005 to 27 February 2006. The interviewees were:

- One correspondent who specialised in science reporting
- Four correspondents who specialised in education reporting
- One foreign correspondent based in the USA who mainly wrote about education

- One freelancer who was commissioned by one of the newspapers in the sample to write an article on the creationism controversy in English schools

All of the correspondents (apart from one educational correspondent who was informed about the debate but did not produce media accounts of the controversy himself) reported the case of teaching creationism and the theory of evolution in the newspapers included in the sample during the sample period.

The names of the interviewees have been anonymized in this thesis and the respondents were assured confidentiality with the aim of encouraging them to speak out about their work without having to fear personal consequences (e.g. Jensen, 2002c; Flick, 2006). Quotes from interviews are therefore listed with only the journalistic specialism of the interviewees.

The number of journalists and special correspondents interviewed is limited and the structure of the sample is asymmetrical: most of the interviewed correspondents specialised in education. To supplement these findings the analysis of interviews with journalists and special correspondents is also grounded in the literature on media production (see Chapter 2; Section 2.3.) and special attention is given to the literature on science in the media and the professional practice of science correspondents. (Few studies have examined the professional practices of education correspondents.) The statements of the science correspondent could therefore be compared with the statements of other science correspondents in previous published research. The research therefore applies the literature on the working practices of (science and other) journalists to the interviews with media professionals.

### 3.3.2. Semi-structured interviews with journalists

The method chosen for interviewing the journalists and special correspondents was the semi-structured interview:

"Semi-structured interviews are non-standardized, and are often used in qualitative analysis. The interviewer has a list of issues and questions to be covered, but may not deal with all of them in each interview. The order of questions may also change depending on what direction the interview takes. Indeed, additional questions may be asked, including some which are not anticipated at the start of the interview, as new issues arise. Responses will be documented by note-taking or possibly by tape-recording the interview. The semi-structured interview allows for probing of views and opinions where it is desirable for respondents to expand on their answers." (Gray, 2004: 215-217)

Semi-structured interviews have the advantage that they provide a degree of structure and flexibility at the same time. It is possible to work through questions prepared in advance in a relatively short timeframe but also to explore issues raised by the respondent and react directly to what they are saying. Therefore one of the advantages of the semi-structured interview is that it is more flexible in reacting to the emphasis that the respondent lays on certain issues than more standardized methods. This is especially relevant in interviews with professionals such as journalists that conduct their work based on experience and expertise (Honer, 1994). Interviewing professionals who professionally interview people themselves required a degree of reflexivity that semi-structured interviews were able to provide (Cant and Sharma, 1998). But the accounts of production processes by the media professionals generated through semi-structured interviews should not be seen as more or less truthful accounts of reality than the accounts of the controversy in the newspaper reports. They are both social constructions and accounts and outcomes of specific social situations. However, comparing and complementing the results of the content analysis with the results of the production analysis can increase the comprehensiveness of the overall study.

The interviews took place face to face or over the phone and all interviews were conducted by the researcher. A semi-structured guideline of prepared questions was used for conducting the interviews. (A core set of questions that all interviewed media professionals

were asked is included in Appendix 3.2.). All interviews were recorded digitally and additionally notes were taken throughout the interviewing process. The interviews intended to shed some light on how media professionals evaluated the newsworthiness of the issue; how they approached the story; where they got their information from concerning this issue and how they assessed the gained information. Several questions addressed the issue of expert sources and expertise.

However, not all the interviewed media professionals were asked precisely the same questions and the way the interviewees answered also varied in length and the emphasis the respondents laid on their answers also differed, sometimes considerably. Therefore the statements and answers to the questions could in various cases not be compared directly and there were more detailed answers on some questions and shorter ones on others.

The digital audio files of the interviews were then sent to a professional agency for full transcription. The transcription processes is theoretically saturated (e.g. Atkinson, 2004; Peräkylä, 2004; Silverman, 2005; 2006). The statements of media professionals were analysed in terms of what the journalists had to say, but not how they said it. Non-verbal cues were therefore not included in the transcripts. Transcripts must be as accurate as possible for full, valid and reliable accounts that allow for detailed analysis. The transcribers were advised to transcribe the interviews verbatim. All transcripts were then checked for accuracy by the researcher and were revised and corrected where necessary. The qualitative analysis of the interviews was carried out using the revised transcripts.

### 3.3.3. Qualitative analyses of the interviewing data

The qualitative analysis of the interview transcripts was guided by the literature on qualitative data analysis (e.g. Moores, 2000; Jensen 2002b; Silverman, 2005; 2006), especially Flick's (2006) suggestion to move from a first broad open coding process

(discussed in Section 3.2.5.a.) to further steps in the development of more specific categories.

Once clear categories had emerged further investigations could put the categories in context. The purpose of the analysis was to find out if there were similarities and differences in the answers of the media professionals about particular issues of the production processes of newspaper accounts of the controversy around Emmanuel College teaching creationism alongside the theory of evolution in science classes. These statements could then be compared with previous studies on science and the media.

In order to analyse the transcripts systematically an open and selective coding process (Flick 2006) was employed to develop categories of the issues the media professionals were talking about. Such issues were for instance "news value(s) of the controversy"; "experts and expertise"; "credibility"; "objectivity and balance"; "quotes" or "promotional strategies" and were broadly based on the questions asked. Some selective coding followed the questions asked, others followed a more inductive process.

After these issues were identified all transcripts were coded systematically using the selective coding technique of "thematic coding" (e.g. Jensen, 2002b; Flick, 2006). This means that all transcripts were analysed repeatedly and every time a sentence referred to one of the issues (such as e.g. news value(s) of the controversy) the sentence was extracted and copied into a new document that collected all the questions and replies of the media professionals concerning this issue.

The outcome of this process was a new document for each of the issues from which the further qualitative analysis was carried out. The statements of the media professionals on the different topics were then compared for consistency in order to find similarities in the statements of the media professionals about production processes. The next step was to search for "deviant cases" where the answers differed strongly from the other answers given in the interviews (e.g. Silverman, 2005; 2006). However, the sample used in this thesis is comparatively small and more educational correspondents than others were

interviewed in this study. Searches for deviant cases would therefore be more meaningful if many different cases could be compared.

The consistent answers and the answers that did not match the answers of other correspondents were then compared along the specialisms of the media professionals in order to see whether this variable had an influence on variations in the statements about the various coded issues. Especially one issue, the legitimacy of the controversy around Emmanuel College and the balancing of accounts of expert sources, led to one deviant case being identified. As a result the categories of Hallin's (1986; 1994) model of types of controversy and balancing (introduced in Chapter 2; Section 2.3.4.) were applied to this issue in order to further analyse and categorise the different views of the media professional on this issue (the results are presented in Chapter 5; Section 5.2.7.).

The statements of the interviewed media professionals were then compared with the articles they have written in the sample to see whether there is a correlation between the statements in the interviews about production processes and their (and other) published accounts in the newspapers. Finally, the statements of the interviewed media professionals could be compared to the results of published research on journalistic practices from studies of science news in order to see if there are differences and similarities. The results of this part of the research are presented in Chapter 5 in the Sections 5.2. – 5.3.

## *3.4. Additional strategies for information and data collection*

The internet is an important tool for reporters (and also citizens and social researchers). Many journalists and specialist correspondents use information obtainable over the internet for background information and online searches to inform stories and select expert sources (e.g. Allan, 2006; Holliman, 2000; 2007).

As an additional data collection strategy online searches were conducted to check what information was available to journalists about the issues of the controversy reported in the newspapers on the internet. Internet searches were especially relevant for the analysis of connections between experts (Section 3.2.5.c.). For instance, many of the expert sources represented in the controversy had personal or institutional websites where they also commented on the debate and gave background information on collaborations with other experts. Also the school in question had a website, the organisation sponsoring the school had a website, further information on official accounts could be found on the websites of the relevant authorities and also petitions, policy documents, reports and press releases had been made available online. It follows that many of the relevant actors in the controversy had realised the potential benefits of providing information in this way.

Searches were led by events and expert sources found in the articles and in some cases websites linked or pointed to other websites that turned out to be helpful in researching the debate around Emmanuel College teaching creationism alongside the theory of evolution in science classes.

These online searchers were therefore "serendipitous" but because of the fluid nature of the internet as medium it is very difficult to sample internet content systematically (see Hewson et al., 2003). Search engines such as Google and the searchable online archives of newspapers and other media outlets were used to look for connections between the expert sources, institutions and organisation represented in the debate as well as relevant documents, such as letters, petitions and reports.

As a result an information archive was created that collected together all materials obtained through the internet. This archive served as additional background information for the study and supplemented the production and content analysis.

Internet searches were used particularly for the investigation of connections between expert sources. These searches were informed by the findings of the analysis of connections between expert sources in newspaper articles (Section 3.2.5.c.). For instance,

if a petition about an issue of the controversy was reported that was signed by several experts the internet was used to find out more about the signatories and the intention of the petition. Copies of the actual text of petitions and letters were available on the internet in most cases. The actual text and names of the signatories of letters and petitions could then be compared with the newspaper accounts. The use of the internet also made it possible to find a further petition signed by some of the quoted experts that was not reported in the newspaper articles.

In places where the use of material obtained through the internet was considered especially relevant, interesting and useful the internet sources where the materials can be obtained accompany the presentation of the findings in footnotes. The results of the analysis of connections between quoted expert sources are presented in Chapter 4, Section 4.4.

## *3.5. Conclusion*

This chapter described the methodology and the methods adopted in the empirical studies conducted in this thesis. The production of newspaper accounts and the content of newspapers is linked (see Chapter 2). An analysis that investigates both elements allows probing the results of the content analysis with the insight gained through an analysis of media production. An approach that combines both of these elements is therefore regarded as being able to provide more meaningful insights about the representation of expert sources and expertise than an approach that studies only one of these elements in isolation.

The studies reported in this thesis analysed media content through the use of quantitative (3.2.4.) and qualitative (3.2.5.) analytical approaches systematically investigating latent and manifest content. The results of the analyses of media content were supplemented with non-systematic online searches (3.4.), which concerned particularly the connections between the quoted expert sources. Media production processes were investigated through semi-structured interviews with media professionals (3.3.2.). However, the sample of

interviewed media professionals is comparatively small and cannot offer more than "snapshot" insights into professional media production processes. In order to increase the range of these insights, more interviews with a range of different types of journalists would be required. However, it was found in this research that the recruitment of media professionals in order to interview them about their professional practice is very difficult.

Compared to the findings achieved through the interviews the findings of the different analyses of media content taken together are assumed to be more comprehensive. The newspaper articles were worked through applying a quantitative approach of content analysis and also three different types of qualitative approaches to analysing media content. This triangulation strategy allowed to compare the results of different types of systematic analyses of media content with the aim of increasing the overall validity of the findings. Additionally the qualitative analysis of connections between experts was supplemented with online searches. However, also the sample of newspapers and the sample period are limited and extension of both could increase the scope of the study.

Furthermore, most of the qualitative analysis presented in this thesis is inductive and does not claim to be objective in the manner many natural scientists would refer to the objectivity of the application of a scientific method. Media and social researchers may prefer certain readings of what they are researching over others. The task of the social scientist is therefore to conceptualise second-order constructions that can help to interpret a certain reading and therefore to explore and understand the meaning implied. These second-order constructions are methodologically and formally controlled re-constructions of the first-order constructions (in the case of this study the newspaper accounts of the controversy and the accounts of the interviewed media professional on production processes) (see Hitzler and Honer, 1997).

A retrospective analysis of media content allowed a comparatively quick collection of valid and reliable data material for a specific issue over a long period of time. However, in a retrospective production analysis the researcher has to rely on the statements of the

interviewed media professionals. Since most media professionals produce many different stories over time it is possible that they cannot remember specific details of a particular story that was produced some time ago. This is one of the limititations of conducting a retrospective analysis of media production. However, a proactive participant observation in a newsroom would provide valid data but cannot be done in retrospect and it is more difficult to employ a case study approach. Questionnaires were dismissed as a method for not being flexible enough to address media production issues from the point of view of the journalist (3.3.).

In order to study the strong connection between the production of media content and the media content itself in more detail, a study of the reception of the newspaper coverage about the debate around Emmanuel College was omitted. The results of the research do therefore not allow drawing any conclusions about how the content and production is perceived by various audiences. Also, the research presented in this thesis focuses on the representation of expert sources in newspapers. Therefore the results illuminate the understanding, selection and representation of expert sources through media professionals. Hence, the results contribute to a better understanding of expertise in the professional practice of journalism but do not allow making generalisation about the nature of expertise per se.

# 4. Analysis of media content: controversies, expert sources and coalitions

The purpose of this chapter is to present the findings of the quantitative and qualitative analyses of media content. The first section (4.1.) gives an overview of the quantitative distributions of the newspaper sample. It describes the distribution of articles, the types of articles published and key events in the controversy around Emmanuel College. The second section (4.2.) investigates which controversial issues were represented in the reporting. The following section (4.3.) documents the distribution of quoted expert sources, then presents the findings from the analysis of quotations and the ways that the expert sources were described. A final section (4.4.) investigates connections between the quoted experts and the different groups and coalitions that emerged in the coverage. It also examines what common aims they were pursuing. The concluding section (4.5.) re-examines the importance of expertise in relation to the representation of this complex controversy.

## *4.1 Overview of newspaper sample and key events in the controversy around Emmanuel College*

Overall LexisNexis offered 758 results for the search term "creationi!" from 1 January 2002 to 20 February 2004, inclusive. Of these, 287 articles were selected to be included in the main sample for further analysis (Chapter 3 provides a detailed description of the data collection procedures). Figure 4.1. shows the distribution of articles from 1 January 2002 to 20 February 2004 by type of article. Figure 4.1. also lists three key events in the development of the reporting of the controversy.

**Figure 4.1. : The distribution of type of article (n = 287) from 1 Jan 2002 until 20 Feb 2004, inclusive**

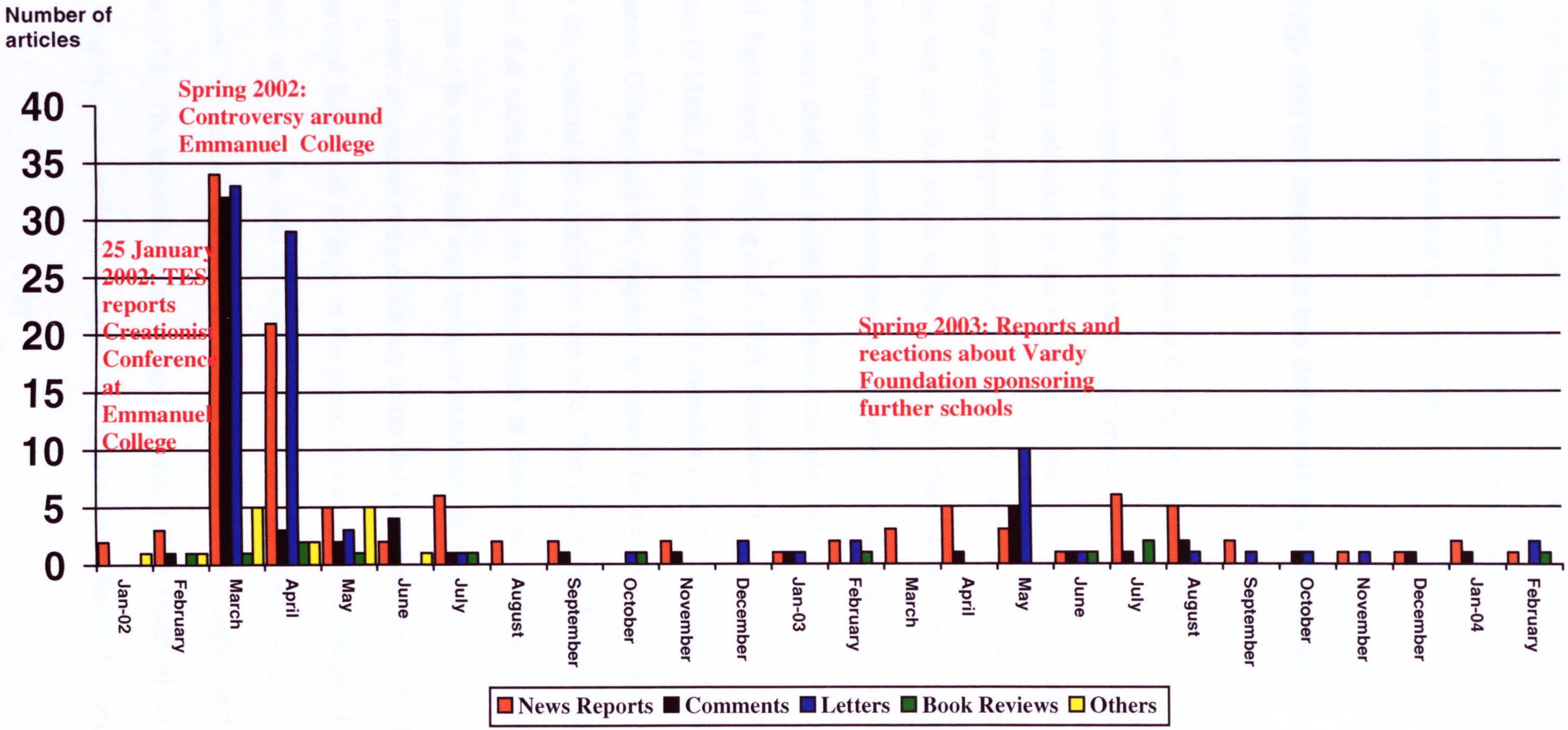

Figure 4.1. illustrates that the articles published in the sample period are not distributed evenly over time. The largest number of articles (together 162 articles) were published in March (105 articles) and April (57 articles) 2002. The following paragraphs provide a chronological account of the key events in the controversy.

### 4.1.1. Chronology and key events in the debate about Emmanuel College

Dean (2002, January 25) reported that Emmanuel College in Gateshead rented out rooms to a creationist organisation that was going to hold a conference at the school. It is possible that this brief news report published in the specialised *Times Educational Supplement,* sensitised journalists and other experts of the potential news value of the teaching practices at the school. This was the first article in the sample that related Emmanuel College to creationism. However, articles mentioning the controversies around creationism and the theory of evolution were published before this event and also before the sample period (e.g. Connor, 2001, September 7; Uhling et al., 2001, September 7).

Several weeks later (9 March 2002 onwards) *The Guardian* published a series of articles relating to Emmanuel College and the controversy around the theory of evolution and creationism – on the weekend the conference was held. One article, by Branigan (2002, March 9), claimed that creationism was being taught at Emmanuel College in science classes and that some of its senior staff were trying to undermine the teaching of the theory of evolution. This report introduced many of the key actors that played an important role in the controversy around Emmanuel College in the press, including: Nigel McQuoid, the head of the school; other of the staff of Emmanuel College; Sir Peter Vardy, whose foundation sponsored the school; as well as a spokesperson of the Department for Education and OFSTED. The scientific expert Richard Dawkins (2002, March 9) wrote a comment on the issue that was published alongside Branigan's report. Hence, it is argued

that expert sources and expertise were important factors in reporting this debate from the start of the sample period. This is not unusual (e.g. see other studies investigating controversial science-based issues in the media such as Coleman, 1997; Bucchi, 1998; Miller and Beharrell, 1998; Albaek et al., 2003; Hargreaves et al., 2003; Holliman, 2000; 2004; Boyce, 2006). Many of the resulting articles that reported further developments in the controversy related back to the issues that were reported in the four articles in *The Guardian* on 9 March 2002. For example, resulting coverage noted that the school in question is sponsored by a religious charity (the Vardy Foundation) established by Sir Peter Vardy and that the school consistently received excellent examination results as well as a very favourable report by the education inspectorate OFSTED.

The point when the controversy became newsworthy for most of the newspapers in the sample was 14 March 2002 after Liberal Democrat MP Jenny Tonge addressed the Prime Minister in the House of Commons[14]. Tonge asked Tony Blair whether he was happy with creationism being taught at Emmanuel College. The Prime Minister did not devalue or condemn the teaching practice but supported the school for its good results and said that he welcomed diversity in education. This was an occasion for columnists to publish commentaries on this issue, in several of the newspapers included in the sample (e.g. Carr, 2002, March 14; Hoggart, 2002, March 14; Johnson, 2002, March 14). The involvement of Tony Blair, who is known for holding strong religious beliefs (e.g. Rentoul, 2002, March 15), also helped to personalize and politicize the debate; in effect he was portrayed as a supporter of Emmanuel College and its educational practices. From this point the Prime Minister or quotes from him appeared in further articles addressing the controversy around

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[14] The transcript of the question by Jenny Tonge and the Prime Minister's reply is available online at: http://www.publications.parliament.uk/pa/cm200102/cmhansrd/vo020313/debtext/20313-03.htm (last checked 24 July 2007). In the last line the PM defends Emmanuel College for the good results "The Prime Minister: [...] I know that the hon. Lady is referring to a school in the north-east, and I think that certain reports about what it has been teaching are somewhat exaggerated. It would be very unfortunate if concerns about that issue were seen to remove the very strong incentive to ensure that we get as diverse a school system as we properly can. In the end, a [13 Mar 2002 : Column 887] more diverse school system will deliver better results for our children. If she looks at the school's results, I think she will find that they are very good."

Emmanuel College and hence the controversy became a political one as well as a controversy about education (based on the policy of City Technology Colleges), and also one about the conflict between scientific and religious explanations for the origins of life.

A further key event in the debate was when a group of scientists called on OFSTED to re-inspect the school. This was reported in *The Guardian* on 14 March 2002. This event was the start of pattern of further coalitions forming in the controversy. Another group of scientists and other experts signed a petition against the teaching of creationism in science classes, which was reported in *The Times Educational Supplement* on 29 March 2002. On 7 April 2002 it was reported in *The Observer* that another group consisting of various experts had sent a petition to the Prime Minister to express their discontent about what is taught as science in faith-based schools such as Emmanuel College. *The Times Educational Supplement* reported on 26 April 2002 that another group of scientists and other academic experts had written to the then Education Secretary Estelle Morris suggesting that creationism and evolution should be considered side by side in school science lessons (these emerging groups will be examined in more detail in Section 4.4.).

On 24 May 2002 *The Independent* and *The Guardian* reported that OFSTED was not planning to take action against Emmanuel College. OFSTED said it was satisfied that Emmanuel College's teaching was in line with the demands of the National Curriculum. This was also reported in other newspapers in the following days.

### 4.1.2. Distribution of articles during the sample period

Figure 4.1. shows that in the course of the debate around Emmanuel College most of the articles were published between 9 March 2002 when *The Guardian* published a series of articles attacking the teaching practice of Emmanuel College and 22 May 2002 when OFSTED announced that it was not going to re-inspect the college (the role of OFSTED in

the controversy will be examined in more detail in section 4.2.3.). In week 12 (18-24 March 2002) more letters than other articles were published in the sample.

After the press release from OFSTED was published fewer articles about Emmanuel College were published. From then on Emmanuel College was mentioned in the press mainly when it came to local issues of sponsoring of schools, especially when the Vardy Foundation was involved in the sponsoring of other schools. Therefore most articles were published in March, April and beginning of May 2002 (see Figure 4.1.). However, neither the issue of a controversy about creationism and the theory of evolution nor the story about Emmanuel College disappeared from the newspaper agenda completely. The story kept its news value to some extent with a small number of articles published in different newspapers throughout the sample period[15].

Figure 4.1.1. shows a second less significant spike in May and June 2003 (another 18 articles where published in May 2003). Most of the articles published at that time were reactions to announcements made in the press in March and April 2003 that the Vardy Foundation was going to open further schools and that it was in negotiations with various city councils to sponsor further schools.

To summarise, the first article mentioning creationism at Emmanuel college was published in the *Times Educational Supplement* on 25 January 2002 but the bulk of articles (162) were published in March and April 2002 (105 articles in March 2002 and 57 articles in April 2002 – see Figure 4.1.) when the controversy around teaching the theory of evolution and creationism at a City Technology College in Northern England was reported in UK newspapers. The distribution of articles in the sample was not unusual when compared to other news events (e.g. Holliman, 2000; 2004; Cassidy, 2005).

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[15] The issue continued to generate reporting in the UK press after the sample period (e.g. Pyke, 2004, June 13; Mansell, 2005; May 6; Steward, 2006, March 10; Bloom and Marley, 2006, October 27).

### 4.1.3. Distribution in newspapers

Following the involvement of the Prime Minister it was mainly the elite newspapers *The Guardian* (66 articles) and *The Independent* (44 articles) that covered the issue, with *The Times* (30 articles) and *The Daily Telegraph* (14 articles) less so. Prior to the intervention from PM Tony Blair it was only the *Times Educational Supplement* and *The Guardian* that had reported on Emmanuel College. The controversy seemed to have most news value(s) for *The Guardian,* the newspaper that published most reports and comments on the issue.

Among the Sunday newspapers it was particularly *The Sunday Times* (11 articles), *The Observer* (8 articles) and *The Independent on Sunday* (6 articles) that covered the debate, but *The Sunday Telegraph* also published four articles about the controversy.

Very few reports appeared in mid-markets. *The Daily Mail* had one report, two comments and one letter on the debate. *The Express* and *The Express on Sunday* each have only one article relating to the case. The popular newspaper *The Sun* did not report the controversy at all but the *Daily Mirror* had one article related to the debate.

The two regional/local newspapers *The Journal* (11 articles) and *The Northern Echo* (11 articles) also published articles on the controversy and usually reported the issues and recent developments at the same time or one day after they were reported in the national elite newspapers and often with a more regional focus. For instance, both the regional/local newspapers had profile interviews with Sir Peter Vardy and his views on the sponsoring of schools (e.g. Smith, 2003, May 20; Morrison, 2003, August 18).

Also, the two weekly specialist publications on education *The Times Educational Supplement* (41 articles) and *The Times Higher Education Supplement* (34 articles) regularly reported on the developments about the controversy around Emmanuel College teaching creationism and the theory of evolution in science classrooms. This is not surprising since both of these publications focus on educational coverage and schools and educational policy played an important role in this debate (see 4.2.2.).

In sum, the debate around Emmanuel College was first reported in a brief news report in a specialist newspaper on education but then taken up by a national elite newspaper. Other publications followed the initial reporting of the controversy especially after the Prime Minister was confronted with this case in Parliament. The issue was mainly reported by elite newspapers, but also by specialist publications on education and regional/local newspapers that were geographically close to the educational institution that was at the centre of the debate. The debate around Emmanuel College was rarely covered by the mid-market and popular newspapers. This result is similar to the findings of Ellegård (1990), who examined the reception of Darwin's theory of evolution in the British periodical press from 1859 to 1872 and summarised his insight: "[...] the low-brow press in general ignored the Darwinian debate, while the highbrow press devoted much space to it" (Ellegård, 1990: 42).

As a result this analysis indicates that the newsrooms of the different newspapers included in the sample judged the news value of the issue differently (the news values of this story will be further explored in Chapter 5, Section 5.2.2.).

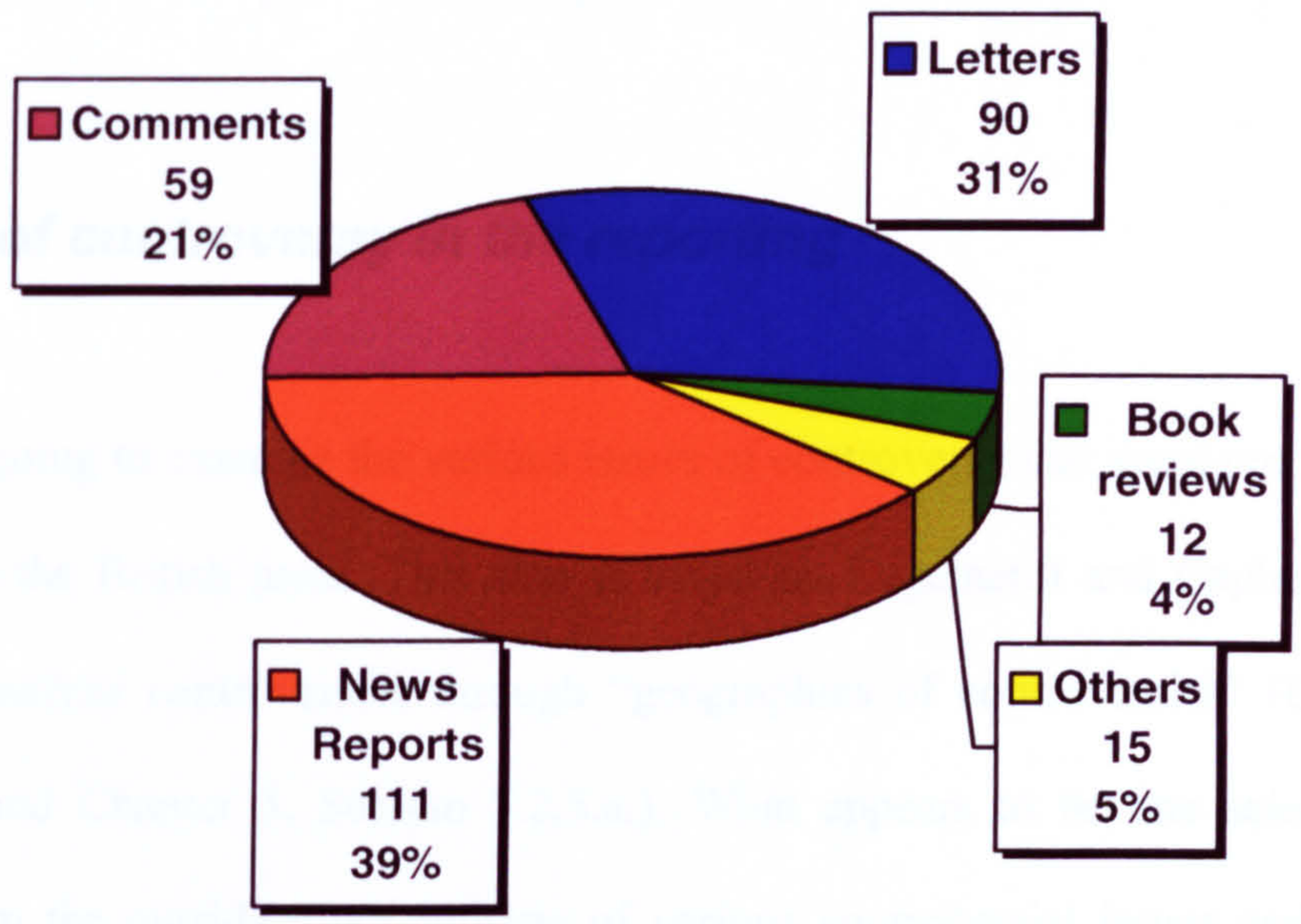
### 4.1.4. Distribution along types of articles

The 287 newspaper articles were placed into five categories (news reports, comments, letters, book reviews and others – see Chapter 3, Section 3.2.3.) in order to distinguish what kinds of articles reported the controversy around Emmanuel College. Figure 4.2. illustrates the distribution of the articles within these categories.

Figure 4.2. illustrates that more than a third of the articles (39 %) that were published in the sample period in relation to the controversy were news reports (111 reports). Almost a third (31 %) of the articles published in relations to the controversy around teaching creationism and the theory of evolution in the sample were letters (90 letters). Compared to other studies this is an unusually high number of published letters (e.g. Clayton et al.,

1993; Holliman, 2000; Cassidy, 2005). However, another study about the debate about origins of life in the US press (Martin et al., 2006) also shows that high numbers of letters were published concerning this specific debate.

**Figure 4.2.: The distribution of types of articles in the newspaper sample (n = 287 articles)**




Fifty-nine articles (21 %) were comment pieces from columnists, leader writers or editorials. This reflects a growing trend in relation to the balance between news and comments (e.g. Steele et al., 1996: Rosen, 2001; Weaver, 2001; Schudson, 2003; Bolz, 2006).

The debate around teaching the theory of evolution and creationism was also treated in 12 book reviews (4 %) and 15 articles that fell in none of the other categories (5 %) also referred to the controversy. These were, for instance, correction and clarification articles or obituaries for people who were involved in the debate around creationism and evolution.

Various experts and their statements on the controversy were present in the coverage from the beginning of the controversy and also throughout the debate. Here it is possible that the selection and representation of experts had an impact on the way the controversy was (re)constructed in the press. The experts that were present in the debate and what they had to say will therefore be further investigated in more detail in Section 4.3.

The articles and comments themselves treated different issues and aspects related to the controversy around creationism and the theory of evolution. Section 4.2. will shed some light on the issues concerning the controversy.

## *4.2. Issues of controversy in the reporting*

This section is going to examine the various issues of controversy that were represented in the coverage in the British press. This step is based on Engelhardt and Caplan's (1987) suggestion to analyze controversies through "geographies of controversies" (Chapter 2, Section 2.1.2. and Chapter 3, Section 3.2.5.a.). What appears to be one science-based controversy from the outside often consists of various controversial issues and involves various social actors (Chapter 2, Section 2.1.2.). This analysis serves as a preliminary step for the analysis of the expert sources involved in the debate around the school (see Chapter 3, Section 3.2.5.b.). The description of the issues presented in this section will therefore provide the background for the further detailed analysis of the role of expert sources and expertise in the controversy (4.3.); the groups that emerge in the coverage (4.4.) as well as the production of news about the controversy (Chapter 5). Here multiple issues could be reported in the same article, for instance a report could cover all or several of the issues that were important aspects and sub-debates of the controversy (e.g. in Branigan, 2002, March 9; Amory and Mintowt-Czyz, 2002, March 15). Many of the articles in the sample were reporting the same issues. Individual articles in this section are therefore only introduced as examples.

### 4.2.1 Teaching creationism and the theory of evolution and the contestation of the science curriculum

One issue that played a central role in the controversy was the teaching of creationism alongside the theory of evolution in science classes at Emmanuel College. One of the first articles by Branigan (2002, March 9) stated that creationism was being taught at Emmanuel College in Gateshead. The article began with the opening lines "Fundamentalist Christians who do not believe in evolution have taken control of a state-funded secondary school in England" and clarifies, "[...] creationist teachers at the city technology college in Gateshead are undermining the scientific teaching of biology in favour of persuading pupils of the literal truth of the Bible" (Branigan, 2002, March 9). The article mentioned that the school was hosting a creationist conference and that "senior staff have given a series of lectures at the college urging teachers to promote biblical fundamentalism and giving tips on techniques to make pupils doubt the theory of evolution" (Branigan, 2002, March 9).

Closely related to the issue of teaching creationism and the theory of evolution is what the National Curriculum requires in science education. Branigan (2002, March 9) wrote that under the National Curriculum, schools must teach evolution but are free to present alternative theories and are not banned from teaching creationism as well (see Chapter 1). One of the educational experts, Gary Wiecek, the vice-prinicipal of Emmanuel College was quoted having said that "[...] It must be our duty as Christian teachers to counter these false doctrines [the Darwinian Theory of Evolution] with well-founded insights" (Branigan, 2002, March 9). Further education experts of Emmanuel College appeared in the article. Several quotes by Emmanuel staff members, such as Nigel McQuoid, John Burn, Gary Wiecek and Paul Yeulett suggested that the educators at Emmanuel College see both evolutionary theory and the theory of creation as faith positions and it was said

that several of its staff members had urged teachers to "show the superiority" of creationist theories (Branigan, 2002, March 9).

A lecture given at Emmanuel College by Stephen Layfield (2002, March 9), head of science at Emmanuel College, in which he investigated ways how to present "the superiority of a creationist world-view against the prevailing orthodoxy of atheistic materialism and evolution in science" in classrooms served as further evidence in the course of the controversy that creationism is being taught at Emmanuel College. Also the fact that the manuscript of the lecture was taken off the websites of the Christian Institute later on – where it was freely accessibly before – was reported in later coverage and served as evidence that this view was taught at Emmanuel College (Connor, 2002, March 21). Connor also offered an alternative webpage address in his article where a copy of the lecture could still be obtained[16]. This manuscript of the lecture given by Emmanuel's head of science was later used as evidence for a teaching practice at Emmanuel College that teaches (young-Earth) creationist explanations as valid scientific theories and was a document that was used to undermine the credibility of Layfield's expertise as head of science (e.g. Dawkins, 2002, March 23; 2006).

A major issue therefore was if and how creationism was taught at Emmanuel College in science. A sub-point of this issue was about debates about the nature of science and whether a good scientist should also be an atheist (e.g. Dawkins, 2002, March 9; Polkinghorne, 2002, March 28).

The information about the teaching practice of Emmanuel College and where, how and when creationism was taught was rather contradictory. Many of the articles merely mentioned that creationism would be taught at the college without specifying where and how (e.g. Vallely, 2002, March 15). The article by Branigan (2002, March 9), for instance, mentioned that Emmanuel's teachers "present evolution merely as a 'theory' no different

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[16] The address given in the article is: http://www.darwinwars.com/lunatic/liars/layfield.html (last checked 24 July 2007); note here that the name of the given internet address strongly challenges the credibility of Layfield.

from the idea that the world was made in six days". This account devalues the theory of evolution by underlining that it is just one theory among others. Another account, that of Bright and McKie (2002, March 17) read "[...] it was revealed that the school was teaching creationist theory as a valid scientific alternative to evolution theory". The teaching practice as it is described here acknowledges the scientific status of the theory of evolution but presents creationism as a theory of equal epistemological status.

Contradictory information also came from staff of Emmanuel College and Sir Peter Vardy, when in some articles they stated that Biblical accounts were taught in RE and/or during school assemblies (e.g. in Herbert, 2002, March 15), and in some others it was predicated that different views on creation were also mentioned in science lessons (e.g. in Smith, 2003, May 20). Hence, a confusing picture emerged; it was not always clear if the controversial issue was about the question in which lessons creationism was taught or if the issue was a challenge to the theory of evolution.

As already mentioned the specific formulation in the National Curriculum about scientific controversies: "Pupils should be taught how scientific controversies can arise from different ways of interpreting empirical evidence [for example, Darwin's theory of evolution]" (DfEE, 1999) was of special importance since it could be interpreted in a way that encouraged challenges to evolutionary theory as an example of "ready made" science (Allgaier and Holliman, 2006). However, it also points to a more general educational issue that became controversial itself in this regard, that is, if scientific controversies should be taught in science education (e.g. Smithers, 2002, July 2002), and if so what cases of controversy are appropriate (see Chapter 2, Section 2.2.2).

Also, the Emmanuel School Foundation (previously named the Vardy Foundation – see Chapter 1) wrote on its website[17] that it does not have an official view on how old the Earth and is therefore not officially embracing a 'young-Earth' (see Chapter 1) creationist

[17] See the section "What does an academy look like under ESF", available online at: http://www.emmanuelctc.org.uk/AcademysFAQ.htm (last checked 24 July 2007).

perspective (which was claimed by Richard Dawkins (2002, March 18) and others in the press coverage). The Emmanuel School Foundation also denied teaching Intelligent Design (see Chapter 1) (which was a topic in science and religion controversies, especially in the US context, see e.g. Burkeman and Jha 2003, April 10).

Nonetheless, although the coverage was sometimes confused, many journalist and expert sources throughout the controversy described Emmanuel College as a school where creationism is taught (e.g. in Owen and Halpin, 2003, August 22). And although it was reported that other schools in Britain were teaching creationism as well (e.g. Pyke, 2002, March 17) the debate around teaching creationism and the theory of evolution focused primarily on the case of Emmanuel College (see 4.2.2).

In sum, one of the controversial aspects was if, how and where creationism was taught at Emmanuel College as part of the National Curriculum for Science, what status creationist theories were assigned by the (science) educators of the school and which lessons were affected. This issue was closely related to a more general discussion about what can and cannot be taught within the National Curriculum for Science and if teaching controversy in general was an appropriate approach for science education (Allgaier and Holliman, 2006). In this regard science education in general and the National Curriculum for Science in particular were battlegrounds for the definition of the nature of science and the boundaries of science (see Chapter 2).

### 4.2.2. City Technology Colleges and the sponsorship of schools

Emmanuel College is a relatively new type of school; it was set up in 1990 as a City Technology College (e.g. Bunyan and Bonthrone, 2002, March 15). These are technically independent schools that are funded by both the state and the private sector. City Technology Colleges were introduced in England in 1988 by the then Conservative government with the aim of improving the financial situation of "failing" inner-city

schools (Halpin, 2005, June 15; Beckett, 2006, October 3). Emmanuel College is a technically independent school but charges no fees because City Technology Colleges are funded by the government as well as the private sector[18].

City Technology Colleges are outside local authority control but are inspected by OFSTED. Since they were elected in 1997 (and again in 2001 and 2005) the Labour government has extended this policy through the introduction of City Academies, which fulfil broadly the same criteria (Beckett, 2007). It is worth noting that the policy of bringing private funds into the state-funded education sector through the introduction of City Technology Colleges and City Academies had attracted media reporting and public debate independent of and prior to the controversy around teaching creationism and the theory of evolution (e.g. Boseley, 1986, December 15; Garner, 2001, November 29).

This policy of state and private funding for schools is of particular importance to the creationism/evolution issue because City Technology Colleges can technically opt out of aspects of the National Curriculum for England and Wales. However, the educators and the sponsor of Emmanuel College argued consistently that they always followed the requirements of the National Curriculum, which was confirmed by the relevant authorities (e.g. Amory and Mintowt-Czyz, 2002, March 15; No byline, 2002a, March 15; Smith, 2003; April 29).

Emmanuel College is not a faith school since it has an "all in-take" policy concerning the denominations of its pupils – but it has a Christian ethos[19]. In the course of the controversy, however, some of the expert sources (and journalists) that criticized Emmanuel College described it as a faith school (e.g. McKie, 2002, April 7).

A central aspect of this controversial issue was the issue of sponsorship: Sir Peter Vardy, a successful car dealer and avowed Christian, donated two million pounds to the school, and

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[18] For a full description of City Academies and City Technology Colleges, see the relevant page of the Department for Education and Skills (DfES), available online at: http://www.standards.dfes.gov.uk/academies/ (last checked 24 July 2007).

[19] See for instance the prospectus of the school, which is available online at: http://www.emmanuelctc.org.uk/school/index.htm (last checked 24 July 2007).

his charitable Vardy Foundation also donated more money to other schools in Northern England (e.g. Branigan, 2002, March 9). Sir Peter Vardy became one of the central figures in the controversy and different speculations could be found in the press coverage about why he was sponsoring schools (see 4.3.4.a.). In the coverage connections were frequently established between the sponsoring through the Vardy Foundation and the teaching of creationism. It was reported that parents and some teachers and politicians, challenged the credibility of the school and feared religious "brainwashing" and "indoctrination" of their children (e.g. Branigan 2002, April 9; Brayshay, 2002, May 24)[20]. This did not only affect Emmanuel College but also further schools sponsored by the Vardy Foundation.

The involvement of Sir Peter Vardy helped to further personalize the debate around Emmanuel College and the teaching of creationism, also acting as a focus for pre-existing concerns about the government's City Academy policy.

In sum, another controversial issue in the debate around Emmanuel College and the teaching of creationism and the theory of evolution was the government policy of allowing private money in state-funded education. The controversy around private sponsoring of state education is a controversy that existed prior to the debate around teaching creationism but the story of Emmanuel College could be used to illustrate the concerns of the critics of the policy of City Technology Colleges and City Academies. However, in a few cases the status of the school was also confused with the status of faith schools, which is a separate policy.

### 4.2.3. The role of OFSTED

OFSTED[21] is an education inspectorate responsible for raising educational standards at English schools and writing reports about the schools. OFSTED reports are the result of

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[20] It is important to note that after the sample period Nigel McQuoid, head of Emmanuel College and then director of schools at the Vardy Foundation, wrote a response to reports that claimed Vardy sponsored schools taught creationism in which he explained how and where different views on creation were taught at schools sponsored by the foundation and that the schools had been cleared of all allegations by pupils, their parents and all relevant education authorities (McQuoid, 2005, October 4).

[21] See http://www.OFSTED.gov.uk/ (last checked 24 July 2007).

inspectors visiting schools and assessing the school and its teaching. These reports assess the academic results achieved by a school. Emmanuel College consistently achieved outstanding academic results (e.g. Amory and Mintowt-Czyz 2002, March 15; Owen, 2003, January 23; Owen and Halpin, 2003, August 22) and received a "glowing" report[22] from OFSTED in 2001 (Branigan, 2002, March 9). Furthermore, the school was designated the status of a "beacon school" by the government (Branigan, 2003, April 29).

The good results and the very favourable OFSTED report that the school received were consequently used as evidence by the education experts of Emmanuel College and its sponsor to show that what the school was teaching led to positive outcomes for the pupils (e.g. Owen, 2003, January 23). Also the Prime Minister backed the school by pointing to the very good results the school achieved when the issue of teaching creationism was addressed in Parliament (e.g. Kallenbach, 2002, March 14; No byline, 2002, March 14).

After reports that Emmanuel College was teaching creationism in science classes, however, a group of scientific experts contested the OFSTED results and called for a re-inspection of the school (e.g. Branigan and White, 2002, March 14; Bunyan and Bonthrone, 2002, March 15; No byline, 2002, March 16). The issue here was that these experts challenged the credibility of the OFSTED inspectors that had previously visited and assessed Emmanuel College and raised the question of whether OFSTED reports were an effective and valid measure of effective teaching in schools.

On 1 April 2002 *The Guardian* (Woodward, 2002, April 1), *The Independent* (Garner, 2002, April 1) and *The Times* (O'Leary, 2002, April 1) reported that Phil Willis, education spokesman of the Liberal Democrats, demanded that the way OFSTED had carried out the inspection of Emmanuel College must be investigated and challenged the credibility of the education inspectorate. Other contributions suggested that authorities such the Department

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[22] The OFSTED inspection report of Emmanuel College from 29 Jan 2001, the one most relevant for the chronology of the events in the sample, is available online at: http://www.OFSTED.gov.uk/reports/108/108420.pdf (last checked 24 July 2007).

for Education and Skill and OFSTED cannot be trusted and must therefore be investigated themselves (e.g. Woodward, 2002, April 1; Garner, 2002, April 1; O'Leary, 2002, April 1). Emmanuel College educators and the sponsor of the school welcomed a re-inspection through OFSTED arguing that they followed all legal requirements of the National Curriculum (e.g. No byline, 2002b, March 15). This was later confirmed by OFSTED and the Department for Education and Skills (e.g. Norfolk, 2003, April 28).

After initial reports that OFSTED was not going to re-inspect the school because the period in which complaints from parents were possible had passed without complaints (Herbert, 2002, March 15), it was first reported on the 26 March 2002 that the head of OFSTED had written to the chairman of governors of Emmanuel College to ask for a clarification of their science teaching practice[23] (Branigan, 2002, March 26). OFSTED then issued a press release[24] on 22 May 2002 to announce that there would be no further inspections at Emmanuel College and to note that the chief school inspector David Bell was satisfied with the school's response about science teaching.

This announcement was reported in *The Independent* (Garner, 2002, May 2002) and in a 36-word report in *The Guardian* (No byline, 2002, May 24). The same issue was also reported in *The Journal* (No byline, 2002, May 25).

Once OFSTED had said it was satisfied that the college's teaching was in line with the demands of the National Curriculum the investigation was subsequently dropped by OFSTED. The scientist and one of the main critics of Emmanuel College Richard Dawkins was quoted in an article by Curtis (2002, May, 24) saying there are now "good grounds for losing confidence in OFSTED."

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[23] The letter by Sir Peter Vardy in his function as chairman of Emmanuel College to Mike Tomlinson, the then chief inspector of OFSTED in which he explains Emmanuel College's position on science teaching is dated 23 April 2002 and available online at:
http://www.OFSTED.gov.uk/publications/index.cfm?fuseaction=pubs.displayfile&id=3254&type=pdf
The letter by David Bell, Her Majesty's Chief Inspector of Schools, back to Peter Vardy is dated 7 May 2002 and also available online:
http://www.OFSTED.gov.uk/publications/index.cfm?fuseaction=pubs.displayfile&id=3255&type=pdf
(both internet sources were checked 24 July 2007).

[24] it is available online at: https://OFSTED.gov.uk/pressreleases/index.cfm?fuseaction=news.details&id=1280 (last checked 24 July 2007).

A further controversial element of the debate around Emmanuel College was the favourable report that the school received from OFSTED and whether or not the school should be re-inspected in the light of the allegations that creationism was taught in science classes. Various experts challenged the credibility of the education authority and attacked especially the OFSTED inspectors that carried out the inspections of Emmanuel College. This was a short self-contained controversy in the overall sample. The controversy around OFSTED and the OFSTED report started on 14 March 2002 when a group of scientific experts contested the OFSTED report and ended with the press release by OFSTED on 22 May 2002.

### 4.2.4. Other issues

Apart from the controversial issues listed above some other aspects emerged that were also related to the controversy around teaching the theory of evolution and creationism. One issue here was the role of education and faith in a multicultural and multi-faith society (e.g. Bates, 2002, April 11), but also more specifically the role of faith schools in teaching creationism (e.g. Purvis, 2002, March 24) and the relations between faith, science and education (e.g. Harries, 2002, March 22). Here references were made to the issue of religious fundamentalism as a threat to liberal societies (e.g. Branigan, 2002a, April 9; Pilmer, 2002, March 29; Smithers, 2002, March 28) and in a few cases the issue of teaching creationism was linked to religious violence and terrorism (e.g. May, 2002, May 19).

Given that most of the articles in the overall sample related to Christianity and Biblical accounts of religious faith with an apparent divide between Christian and atheist viewpoints it is worth noting that a few articles (e.g. Pyke, 2002, March 17; Purvis, 2002, March 24) and also letters (Malik, 2002, December 28; Wilkens, 2002; Wood, 2002) approached the controversy from a multicultural or multi-faith perspective. These articles

examined how creationist accounts and the theory of evolution are taught in various religions and non-Christian faith schools.

The controversy had a strong regional focus on Emmanuel College in Gateshead, North England alongside national implications for schools and the curriculum mainly in England but also in Wales (e.g. Branigan, 2002a, April 9). However, some articles also offered perspectives on creationism and how it was taught in other localities. Of the 287 articles in the sample 239 focused on the situation in England (and Wales). 22 articles reported events in the USA (e.g. No byline, 2002a, March 9; Phillips, 2002, March 29; Burkeman and Jha 2003, April 10), the remaining 26 referred to the situation in a number of countries.

Some non-UK-based scientists, for instance, wrote comments (e.g. Pilmer, 2002, March 29) or letters (Shanks, 2002, March 11) attacking creationists, comparing the situation to that of their home countries. The science correspondent Henderson (2002, March 18) reported that Christian fundamentalists in the United States were impressed by the ease with which Peter Vardy's Foundation had advanced creationist teaching through its links with Emmanuel College, in which Vardy had invested two million pounds. It was further reported that senior figures from the Institute for Creation Research in North Santee, California, were about to undertake a fact-finding mission in southern England in September 2002 (Henderson, 2002, March 18). As a result American creationists were considering whether to invest millions of pounds in British schools to promote literal interpretations of the Bible as an alternative to the theory of evolution. Furthermore, it was also reported that higher education institutions were involved in the debate when an Australian creationist organisation targeted UK university campuses (Farrar, 2002, March 22; Branigan 2002, March 25). These examples illustrate the globalised nature of the media marketplace and the ease with which information can travel globally in networked societies (e.g. McNair, 2004).

Another issue in the debate was the primacy of discourses, or in other words the question which version of the "truth" was the prevalent and correct one. This issue also played a

role in previous case studies on science and controversy in the media (e.g. Coleman, 1997; Bucchi, 1998; Holliman, 2004). The correct version of "the truth" was an implicit issue in many of the reports about the controversy and was often more explicitly treated in comments and letters. Here it is also worth noting that in some comments and letters "postmodern relativism" was seen as a pre-requisite why fundamentalists could gain ground in attacking the "truth" of scientific knowledge (e.g. No byline, 2002, March 22; Smithers 2002, March 28) (see also Hind, 2007).

### 4.2.5. Summary: Not one but many controversies

In this section the controversy around teaching the theory of evolution and creationism at Emmanuel College was examined and it was shown that what appeared to be one controversy actually consisted of several controversial issues related to the debate. In other words, the controversy was not one but many.

Engelhardt and Caplan's (1987) suggestion of mapping controversies with a scientific dimension was helpful in order to the separate various controversial issues in the debate around Emmanuel College. This analysis shows that the controversy had scientific, educational, political, religious, social, cultural and international dimensions. That public controversies about science and technology have more dimensions than just a scientific one is not unusual and also documented in other studies (e.g. Mendelsohn, 1987; Petersen and Markele, 1989; Peters 1994; 1996; Holliman, 2000; 2004). However, it is relatively unusual for there to be for a scientific theory that has been established "ready made" science (Latour, 1987) to be contested in media reporting in this way. In cases of challenges to "ready made" science it is unlikely that there will be a lot of scientific experts speaking out against the scientific consensus view and it is more likely that "ready made" science is attacked from non-scientific experts. From the point of the view of the scientists

challenges to the scientific consensus are challenges to the way how science works as a whole.

The various issues of the controversy around Emmanuel College were sometimes confused, for instance it was not always made clear in the articles where and how creationism was taught at Emmanuel College, if the school contested the theory of evolution or not and if it was a faith school or not. Variations about these issues in the newspaper articles can only be found if a large sample is examined.

Furthermore, some of the controversial issues pre-dated the controversy around Emmanuel College (for instance the issue of private sponsorship in state-funded education) and only one self-contained issue (the contestation of OFSTED) was "resolved" during the sample period. The lack of closure concerning the other controversial issues and the many angles from which this controversy could be approached may therefore be a reason for the low level but sustained press coverage the story received. The next section is going to examine if relationships between the various controversial issues of the controversy and the types of quoted expert sources can be found.

## *4.3 Experts in the controversy around teaching creationism and the theory of evolution*

Expertise is a key resource in many controversies involving science and can also have an impact on the decision-making processes and on the public opinion about certain issues (e.g. Nelkin, 1984; 1987; 1995) (see Chapter 2, Section 2.1.2.). Also the way expert sources and expertise are presented in media accounts of socio-scientific controversies can have an effect on how their credibility is perceived and the arguments being made (e.g. Conrad 1999; Barnes, 2005). This section is going to have a closer look at what kinds of expert sources were represented in this particular debate, what they were saying and how they were described. It is also of interest if and how various expert sources got together in

alliances and coalitions to reach common goals, which will be examined in the following section.

### 4.3.1. Distribution of experts in the sample

304 experts were quoted directly in the sample (see Chapter 3, Section 3.2.4.d. and 3.2.5.b. and Table 3.4. for data collection and analysis). To classify the experts cited in the newspaper coverage in the sample seven categories were produced (Figure 4.3.).

**Figure 4.3.: The chart shows the distribution of 304 directly quoted experts**

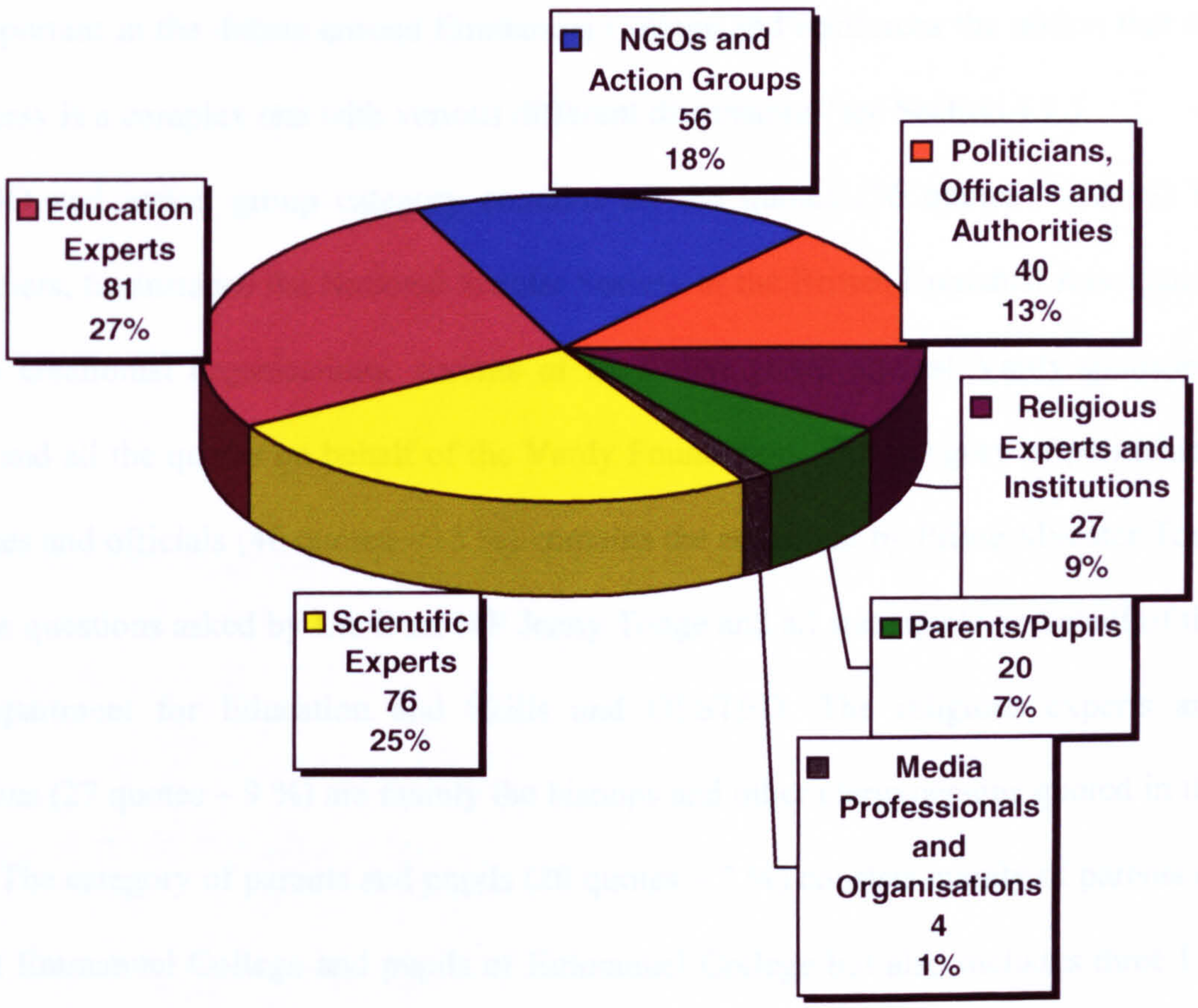

Figure 4.3. illustrates that the quotes of the various groups of experts are not distributed evenly in the coverage. Two categories of experts were quoted most often: This is the group of educational experts, organisations and institutions (81 quotes – 27 %) and the group of the scientific experts, organisations and institutions (76 quotes – 25 %). These results suggest that expertise in science and in education was particularly present in the newspaper coverage about the controversy.

The group of the education experts and institutions comprises the educators from Emmanuel College, representatives of teacher unions and other individual education experts. The group of the scientific experts, organisations and institutions contains quotes primarily from individual high-profile scientists (such as Richard Dawkins who is quoted 21 times, more than any other expert in the sample). However, taken together the category of scientific and education experts make up only 52 percent of the experts quoted in the sample. That means that the other half of the experts quoted in the sample were experts of other categories. This finding suggests that more than just scientific and educational issues were important in the debate around Emmanuel College and reinforces the notion that the controversy is a complex one with various different dimensions (see Section 4.2.).

The NGO and action group category contains all the quotes (56 quotes – 18 %) by campaigners, for instance the National Secular Society or the British Humanist Association but also creationist organisations, parents of an action group against Vardy-sponsored schools and all the quotes on behalf of the Vardy Foundation. The category of politicians, authorities and officials (40 quotes – 13 %) contains the statement by Prime Minister Tony Blair, the questions asked by Lib Dem MP Jenny Tonge and all statements on behalf of the then Department for Education and Skills and OFSTED. The religious experts and institutions (27 quotes – 9 %) are mainly the bishops and other clergypersons quoted in the sample. The category of parents and pupils (20 quotes – 7 %) consists mainly of parents of pupils at Emmanuel College and pupils of Emmanuel College but also includes three US

parents and pupils. Also a few media professionals (4 quotes – 1 %) were quoted in the sample.

The result that a wide range of expert sources was involved in the reporting of the debate around Emmanuel College and teaching creationism/evolution matches the results of other studies on public representations of science and technology debates (e.g. see Coleman, 1997; Bucchi, 1998; Miller and Beharrell, 1998; Hargreaves et al., 2003; Holliman, 2000; 2004; Ten Eyck, 2005; Boyce, 2006). Since most scientific and technological controversies have various dimensions, it is not surprising that a plethora of experts publicly speak out on them (e.g. Peters, 1994; 1996).

However, the further analysis to follow suggests that it is important not only to look at who is quoted but also to investigate what the quoted experts are saying in order to distinguish different argumentation lines and the various issues that are addressed by the quoted experts. The next section investigates this issue and it also examines how the quoted expert sources were described in the articles. This part of the analysis is based on a qualitative examination of the articles published in the sample period (for a detailed account of the qualitative investigation see Chapter 3, Section 3.2.5.b). The analysis presents the statements of the first three expert categories in different idealized categories. However, it is important to note that there were still variations within these categories. The numbers of quotes in the last four expert categories were to small to categorise them accordingly.

### 4.3.2. Education experts, organisations and institutions

In the sample there were 81 education experts, organisations and institutions quoted – this is more than in any other groups of experts. Three categories of arguments were identified in the qualitative analysis of these quotes:

a.) Arguments of education experts supporting or defending Emmanuel College and its teaching practice (53 quotes)

b.) Arguments of education experts criticizing sponsorship in education (10 quotes)

c.) Other arguments of individual education experts (18 quotes)

Most of the quotes (53 quotes - 65.4 %) in the category of the education experts were by education experts associated with Emmanuel College that were defending the school against critics. The second group of quotes (10 quotes - 12.3 %) by education experts were attacking the policy of private sponsoring in state education. Here Emmanuel College was used as an example to illustrate the negative consequences of the City Technology College policy. The arguments in this group were brought forward by education experts associated with teaching unions. The third group of quotes (18 quotes - 22.2 %) by education experts were quotes by various individual education experts that were too varied to be grouped in a separate category and did not fit into one of the first two categories. The arguments the educational expert sources made are consistent with the analysis presented in the previous section and address various of the controversial issues of the debate.

The following sub-sections will describe them separately and give some illustrative examples.

### 4.3.2. a.) *Arguments of education experts supporting or defending Emmanuel College and its teaching practice*

This group consisted of education experts that are associated with Emmanuel College. The most quoted education expert in the sample (and source cited second most often after the scientific expert Richard Dawkins) is the principal of Emmanuel College Nigel McQuoid. He was quoted in 17 articles. The situation that Nigel McQuoid and Richard Dawkins were the experts quoted most often had the effect of personalising the debate. The descriptions of Nigel McQuoid did not challenge his credibility as he was mostly described by his

function as the head teacher or principal of Emmanuel College (e.g. in: Dean 2002, January 25; Phillips, 2002, March 15). Such descriptions established a degree of credibility by pointing to the professional experience and position of Nigel McQuoid. Only one description in the sample emphasised his faith. Amory and Mintowt-Czyz (2002, March 15: 8) described him the following way:

"The head teacher, an evangelical Christian in his mid-40s called Nigel McQuoid [...] "

This description depicted McQuoid as a certain kind of head teacher, one that may be led by his religious convictions. The authors deemed the faith of McQuoid to be relevant to be mentioned in his description but it cannot be said that it was clearly used in this case to challenge his credibility as an education expert. The fact that the authors mentioned the age of McQuoid could be interpreted in different ways as well, for instance that he is comparatively young for a head teacher and might lack the professional experience necessary for this position or that he was very successful in pursuing his career as educator.

In the sample McQuoid's arguments for the educational practice at Emmanuel College varied. McQuoid and the other educators at the school pointed to the excellent results the institution achieved and also to the very positive OFSTED report (Section 4.2.3.). It was also stressed that all legal requirements of the National Curriculum were met by the school. One strategy concerning the teaching of creationist examples in biology classes alongside evolution theory referred to a pluralistic viewpoint. In this argumentation line the religious truth claims were compared to the truth claims of the scientific explanations in order to offer pupils various accounts on the origins of life.

In this line of argument it is the welfare of their pupils that is the reason for their educational practice. It is suggested that it should be up to the pupils and not to the educators to determine what individuals think or believe. Here the Emmanuel College

experts referred to the culturally shared value of democratic citizenship in Britain and argue against what they see as indoctrination and censorship.

Besides the good results the pro-creationist educationalists highlighted the non-selectiveness of their institutions and their general openness for children of all faiths and different abilities. In contrasting their own approach with the approaches of other schools and educational institutions they attempted to depict other approaches as fundamentalist, dogmatic and indoctrinating in regard to the theory of evolution and at the same time presented themselves as liberal educators that offered various theories and explanations to their pupils. The following quote illustrates this argument:

"Nigel McQuoid, head at Emmanuel College in Gateshead, said pupils were taught creationism the belief that humans are all descended from Adam and Eve alongside evolutionary theories and encouraged to make up their own minds. Mr McQuoid said yesterday the school was not brainwashing any of its pupils into the hardline Christian stance. [...] Mr McQuoid said yesterday: "I can assure you, as a college, state funded, that we will teach evolution as we are asked to do and the controversies surrounding it.

"It will be for the children to view the science, as it will be for adults, to see what they wish to believe.

"I believe in openness, I believe in debate and I believe that children have a great ability to see when they're being brainwashed and when they're being given a choice.

"Let the science speak for itself."" (quoted in: No byline, 2002, March 18: 6)

In this quote McQuoid was also described in his professional function as head teacher and he reacted to allegations that children were being brainwashed at his school. By claiming that they are not indoctrinating pupils into "the hardline Christian stance" he moves the approach of Emmanuel College away from fundamentalist Christian approaches and is thereby responding to the allegations. What follows is the recourse to the democratic ideal of informed choice and the belief in the abilities of the pupils to learn about different approaches and decide for themselves which they find more convincing.

McQuoid depicted the school as a place for open discussion and it is at the very heart of the debate that in this quote he wanted to let the science speak for itself. However, in

science and in science education (and also in journalism in this regard) "the facts" do not speak for themselves and spokespeople have to give the facts (or "the science" in this instance) a voice, an issue that is a central aspect in the debate around Emmanuel College (4.1.1.).

The informed choice argument, i.e. the idea of offering children various viewpoints assumes that different decisions will be made and some children will decide that they "believe" in creation and/or the theory of evolution. Many scientists challenge this idea because they only see a single solution (when there is a scientific consensus) – that is the recourse to science through "rational" choices.

Another rhetorical strategy that was applied in fewer quotes was to react in a way that is modelled on scientific rhetoric. This strategy referred to the validity of the creationist account but drawing on scientific rhetoric. Here several Emmanuel sources were quoted saying that it was their intention to present their version of the origin of species and the Earth alongside evolution theory because they can prove it and have evidence for it, for instance:

" [...] Emmanuel's head of science, Steven Layfield, was found to have listed helpful hints for those "engaged in the struggle to show the superiority of a creationist world-view against the prevailing orthodoxy of atheistic materialism and evolutionism in science". He noted, for instance, that "the feasibility of maintaining an Ark full of representative creatures for a year until the waters had sufficiently receded has been well documented."" (quoted in: Bennett, 2003, May 1: 11)

In this quote Steven Layfield was described by his professional function as Emmanuel's head of science. In the quote Layfield is exhibiting the same truth claims as scientific sources arguing against creationist explanations. This issue links to the question what should be taught in science education and Layfield argued for the inclusion of creationist thought into the science curriculum as parts of the scripture, such as Noah's Ark in this quote, could be proven following experimental work. For the scientific experts in the

sample this criterion did not suffice for a fact being scientifically proven (see 4.3.3.). The argument of Layfield goes that his version of the story is excluded from the official scientific discourse because he openly presents himself as Christian believer and that the institutionalized science system is an atheist and materialist enterprise and is therefore systematically trying to exclude believers, not because they are bad scientists but because of their creed.

In some of the quotes it was displayed that the quoted Christian educationalists see the current evolutionary explanations and the surrounding discussion as a political strategy of Darwinian scientists to exclude Christian belief or the possibility of an existence of God from "scientific" debates. In contrast, quotes from the Emmanuel sources describe the "official" pro-Darwinian scientific explanation as a dogma or belief-system. In one article Nigel McQuoid was quoted saying that it would be "fascist" to suggest that schools should not "consider the scientific case for creationist theories" (Branigan, 2002, March 9). Here McQuoid compared the anti-creationist scientific institutions with a totalitarian system and portrayed his school and himself as a victim of an unjust system and unjustified attacks on the teaching practices at Emmanuel College.

The emphasis in this set of arguments lies on the rightness of personal beliefs or on the falsehood of opponent views, such as the attacks of Darwinian scientists on anti-Darwinian creationist worldviews. Whereas in deploying scientific rhetoric some creationists attempted to depict themselves as being members of the "scientific community" in this stream of arguments the scientific "community" is depicted as a different and opposed social group that shares a common belief or a common body of politic thought.

Emmanuel College sources were in the most cases described by their professional function at the school. However, as illustrated in the quote of Stephen Layfield the content of the quotes could in several cases potentially undermine the credibility of their professional function. For instance, a couple of descriptions moved some of the Emmanuel College

experts close to fundamentalist right-wing Christian belief. Norfolk (2003, April 28: 4), for instance described John Burn, the former head of the school, the following way:

"John Burn, the Vardy Foundation's chief academic advisor, head of the right wing Christian Institute and a former headmaster of Emmanuel [...]"

This description associates an education expert of Emmanuel College with two institutions that were also controversial in the newspaper coverage, especially the Christian Institute which was described as an organisation set to "promote fundamentalist Christian beliefs" (Branigan, 2002, March 9) in previous coverage and is in this description associated with a right wing political orientation.

Critics of Emmanuel College that appeared in the newspaper coverage claimed that the education experts at Emmanuel College were "peddling creationism" and "indoctrinating" children. Such quotes or descriptions that mentioned these allegations often appeared previously to the quotes of education experts of Emmanuel College (e.g. in Amory and Mintowt-Czyz, 2002, March 15).

However, there was also one single case of a description that added credibility to the professional function of an expert that is related to Emmanuel College. Richard Coupe who is principal of King's Academy (Emmanuel College's sister school, also sponsored by the Vardy Foundation) is described by Jennings (2002, July 22: 1) the following way:

"Mr Couple has 26 years of teaching experience in the comprehensive and independent sectors and was previously head of religious studies at Leeds Grammar School."

This description indicates more than two decades of teaching experience in different types of schools as well as a previous higher professional position at a (presumably) secular school.

In sum, Emmanuel College sources were generally described by their professional function. However, in some cases the contents of their quotes seemed to oppose their professional position and sometimes also the personal faith of Emmanuel College experts was stressed or links to faith-based institutions were described. A couple of descriptions linked personal religious convictions of the experts to their occupations. Only one description was found that could be seen adding credibility to the professional function of an Emmanuel College source.

The quotes of the education experts of Emmanuel College referred to various of the controversial issues of the debate, for instance, the debate around the science curriculum and what should be taught in science education (4.2.1) and the good results exemplified through the OFSTED report (4.2.3.) but also the democratic ideal of free choice in pluralist societies (4.2.4.).

### 4.3.2. b.) *Arguments of education experts criticizing sponsorship in education*

Ten of the education experts quoted in the sample were related to teaching unions. Representatives and members of teaching unions showed themselves to be concerned about the case of Emmanuel College and also about the teaching of creationism. However, compared to the arguments of the scientists they were less concerned with questions of scientific validity and truth of Biblical or scientific accounts on the origin of life.

The education experts affiliated with teaching unions represented the profession of teachers and were more concerned with the potential influence private sponsors could have on education and thus on education policy. The quotes of education experts associated with teacher unions therefore mainly referred to the controversial issue of the policy of City Technology Colleges (and City Academies) using the example of Emmanuel College teaching creationism as an illustration for the negative influence of sponsorship in (state) education (see Section 4.2.2.). All of these education experts opposed the idea of teaching

creationism and were also anxious about the influence of religious faith in education. For instance, the teaching union NASUWT (National Association of Schoolmasters Union of Women Teachers) opposed private-sector involvement in education, saying it was "unacceptable and unethical" (Dean, 2002, January 25).

Therefore the new school type of City Technology Colleges (or City Academies), private sponsoring and faith schools in general were the major issues in this category, as illustrated in the following quote:

"Eamonn O'Kane, NASUWT general secretary designate, said: "You have got people putting millions into schools. These people have strong views and want them to be propagated. Once you accept this infusion of private capital into schools this sort of thing is bound to happen.

"The Moonies have millions. They could start a school with marvellous facilities and begin to develop the sort of thinking most people would find completely objectionable," he said."

(quoted in: Cassidy, 2002, March 19: 10)

In this quote O'Kane was described by his position in this teaching union and he used the example of the religious minority movement the Moonies (a derogatory term for members of Sun Myung Moon's Unification Movement) to describe the negative consequences of private sponsorship of schools. Following this argument, rich people with strong views could use their money to create excellent facilities but use these facilities to promulgate minority views that are objected by the majority of the members of society. In other words, the money of wealthy donors comes with strings attached. In this sense religious minorities could use education to influence the thinking of children in secular society.

Teaching unions objected to the influence of private and religious sponsors in education because they didn't want to be seen helping to promulgate (religious) minority views but also did not want to see the work of teachers influenced or regulated by private (religious) sponsors. Sir Peter Vardy and the account of Emmanuel College teaching creationism in science education was generally mentioned as a negative example of the consequences of

private sponsoring in education. This view could also be interpreted in a way that sees the experience and expertise of the teaching profession as a necessary precondition for the successful and rounded education of children in Britain.

The members of teaching unions were all described by their function in the union and the union they were part of. There were no descriptions that further qualified these descriptions and therefore added or challenged the credibility of these expert sources.

### 4.3.2. c.) *Other arguments of individual education experts*

There were further 18 individual education experts cited in the sample. The quotes of these education experts addressed several issues of the debate. Four of them were academic science education experts (all cited in stories about the US context, in the UK context no academic science education experts were quoted at all), the others were religion, science, language or unspecified teachers or education staff. Matters in their quotes were diverse and ranged from curriculum issues (e.g. in Cassidy, 2004, January 16; Mansell, 2004, January 2004) to multi-cultural and multi-faith perspectives on education and the origin of life (e.g. in Purvis, 2002, March 24). Also various positions could be found whether or not religious approaches contradict science (e.g. in Wignall, 2003, November 25) – here it was interesting that science teachers often used arguments similar to those of the anti-creationist scientists. Another issue was whether the relationships between science and religion were seen as complimentary or contradictory and if this deserved attention in education (e.g. Phillips, 2004, February 13).

All education experts were described by their professional function and title and generally also the educational institution they are affiliated with. In two cases science teachers that argued against the exclusion of the theory of evolution from education were described in a way that enhanced their credibility. For instance the biology teacher Wes McCoy was described by Phillips (2004, February, 13: 20) the following way:

"Wes McCoy, Georgia's 2003 outstanding biology teacher of the year and a veteran teacher of 26 years from North Cobb high school, near Atlanta [...]"

A description like this can boost the credibility of this education expert source by stressing more than two decades of "veteran" teaching experience and the fact that this expert also gained the title of an "outstanding biology teacher" in Georgia in the year 2003.

### 4.3.3. Scientific experts and scientific institutions

Most of the 76 scientific sources were described by their name, academic title, their affiliated institution and by their discipline. A look at the disciplines of the quoted experts reveals that the majority of scientific sources were located within the field of life- and biosciences (52 quotes), in most cases in biology, but also geology (3 quotes), physics (3 quotes), chemistry (1 quote), environmental sciences (1 quote) were represented here. Concerning the debate around the theory of evolution it is not surprising that most of the quoted scientists were life scientists. However this finding also illustrates that the debate about the origins of life also concerns disciplines such as geology or cosmology (see Chapter 1).

Among this group of expert sources it turned out that, even though their arguments were expressed within one "scientific discourse" (e.g. Montgomery, 1996; Gilbert and Mulkay, 2003) with a similar rhetoric, their arguments about issues that concern the debate about the theory of evolution and creationism differed. Three different argumentation lines could be identified amongst the quoted scientific expert sources:

a.) Scientific experts defending the scientific status of the theory of evolution and/or attacking creationism (69 quotes)

b.) Scientific experts challenging the epistemological status of the theory of evolution (3 quotes)

c.) Scientific experts arguing that religious and scientific accounts do not contradict each other (4 quotes)

The distribution of the quotes indicates that the majority of the quoted scientific experts (69 quotes - 90.7 %) opposed the idea of creationism having scientific validity and defended the scientific consensus. However three scientific experts (3.9 %) were found challenging the epistemological status of the theory of evolution. Another four scientific experts (5.2 %) argued that religious and scientific accounts do not necessarily contradict each other.

Each of them is described with some illustrative examples in the following sub-sections.

### 4.3.3. a.) *Scientific experts defending the scientific status of the theory of evolution and/or attacking creationism*

The largest group (69 quotes) of scientists argued in favour of the theory of evolution and/or against scientific validity of creationist accounts. Here one scientist was particularly present. He was quoted in 21 cases – more than any other expert in the sample: Richard Dawkins. He was present as a scientific expert and critic of Emmanuel College in the very first article related to the controversy (Dean, 2002, January 25). Dawkins also wrote several articles and letters on the controversy (Dawkins, 2002, March 9; 2002, March 18; 2002, March 23; 2002, March July 6) and was also present in other media channels during the debate (e.g. television).

Richard Dawkins is Charles Simonyi Professor of the Public Understanding of Science at Oxford University[25]. He is an ethologist, evolutionary theorist and popular science writer.

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[25] For further information about this professorship see the homepage. The chair is funded by the computer scientist Charles Simonyi: http://www.simonyi.ox.ac.uk/index.shtml (last checked 25 July 2007).

Moreover, he is also a member of the British Humanist Association (BHA) and has since 1996 been Vice President of this organisation. The BHA publicly argues against faith-based education and sees its mission as the promotion of humanism and a life without religious or superstitious beliefs[26]. Richard Dawkins is a convinced atheist and he is known for having strong views on religion and belief[27].

Most of the descriptions of Richard Dawkins described him by his title as professor and affiliation with Oxford University. However, many of the descriptions further qualified the depiction by calling him, for instance, an "eminent scientist" (No byline, 2002, March 16), "an authority on evolution" (Branigan, 2002b, April 9), "one of the world's most eminent academics on the theory of evolution" (Smith, 2003, May 20) or "a leading academic" (Smith, 2002, April 29) generally in addition to his title and affiliation with Oxford University. These examples are comparatively clear illustrations that some descriptions of experts by journalists can add credibility to their statements.

However, a few descriptions also referred to his view on religion and describe him as "atheist academic" (Bunyan and Bonthrone, 2002, March 15) or as an "ultra-Darwinist and professor of understanding of science" (the word "public" is missing) (Hackett and Waterhouse, 2002, March 17) which could also add or challenge his credibility, depending on the reader's perspective.

Richard Dawkins' point of view was that the theory of evolution is scientifically correct since it is supported by empirical evidence. Creationist views, on the other hand, could in his view only be supported by faith. For instance Branigan (2003, April 29: 6) quoted him the following way:

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[26] See their homepage for further information: http://www.humanism.org.uk/site/cms/ (last checked 25 July 2007).

[27] See for instance Dawkins (2006) or the two-part documentary on the harm that is caused through religious belief entitled "The root of all evil?"; Part 1 "The God Delusion" broadcast 9 January 2006 and Part 2 "The Virus of Faith" broadcast on 16 January 2006 on Channel 4, UK. For Dawkins' view on religion see also Orr (2007) and McGrath (2004; 2005; 2007).

"[...] Richard Dawkins, Charles Simonyi professor of the public understanding of science at Oxford University, said that equating evolution and creationism was "educational debauchery".

"Evolution is supported by mountains of scientific evidence," he told BBC Radio 4's Today programme. "These children are being deliberately and wantonly misled.""

The description of Richard Dawkins established credibility as an academic expert and linked him to the prestigious University of Oxford. Dawkins was defending the boundaries of science and stated that the theory of evolution is supported by "mountains of scientific evidence" which points to the consensus in the scientific community about the epistemological status of the theory of evolution and also distinguishes "scientific" evidence from other forms of proof.

Mountains, metaphorical and otherwise, are unmovable and so is the weight of the scientific evidence for the theory of evolution according to Dawkins. Furthermore, he presumed in this quote that children at Emmanuel College were deliberately being misled away from the scientific truth. The conclusion that followed for Dawkins was that the theory of evolution must be taught in science classes as the only valid scientific explanation for the origins of life. Schools that do not follow this approach deviate from the scientific consensus view and mislead children. For Dawkins the only "real" truth that can be found is the truth of scientific explanations, backed up through empirical evidence, or more generally what could be dubbed "the scientific method". This statement can be seen as an example for the rhetoric boundary work of a scientific expert, demarcating science from religious accounts.

It followed for Dawkins and some of the other quoted scientists that good science has to be "rational" in nature and is directly opposed to religious faith and beliefs. For instance, Peter Atkins, described as "science author and chemistry lecturer at Oxford University" in No byline (2002c, March 15: 11) was quoted saying:

""Science is incompatible with religion, regardless of what the religious, desperate to preserve their dwindling patch, may say. The worst type of religion - such as the junk intellectual deceitful pulp peddled as creationism - seeks to undermine the one true way we have of arriving at an understanding of our wonderful world, which is by publicly shared experimentation allied with thoughtful reflection, and undermines the ability of people to think honestly, which is what education should be about.

Even the more respectable forms of religion, such as institutionalised Christianity and Islam, propagate manifest nonsense that is totally incompatible with our scientific understanding of the world and can lead to the adoption of attitudes with appalling consequences.

These religions should be taught only as a part of our cultural history, for their impact there is undeniable, but they should be presented only as quaint ways of disguising ignorance, propagating wishful thinking, and exercising power over the ignorant and weak.""

This quote illustrates the epistemologically inferior nature of religion compared to the superiority of science in Atkins' view. The derogatory description of religion as a harmful and deceitful strategy of "exercising power over the ignorant and weak" is contrasted with the one and only truth of science. The heterogeneity of the untruthful religions is described as being between bad and worse whereas science is a homogeneous and empowering entity that is the prerequisite for education and understanding and the development of reflective, independent and candid citizens. This quote is another example how the boundaries between religion and science are defended by a scientific expert.

Some of the pro-evolution scientists also do not accept creationism as religious faith or belief (and also not as scientific theory). For instance, in an article relating to the US context and the case of "Intelligent Design" (see Chapter 1) the scientist Kenneth Miller was quoted saying that the theory of "Intelligent Design" is "stealth creationism – it's been recognised for what it is, which is a quasi-political theory" and "a very good rhetorical strategy, because it appeals to the very American sense of openness and fair play" (Burkeman, and Jha, 2003, April 10: 4).

The view that creationism is wrong and should not be taught in science classes is the dominant view amongst the scientific experts in the sample. All of the scientific experts

challenging the scientific status of creationism saw the theory of evolution as the scientifically correct explanation of how life originated and also wanted to see it taught in science education in schools. The prevalent argumentation pattern that was used by the scientists related primarily to what could be dubbed "the scientific method". In many cases the scientists related to "evidence", "proof" and "experiments" to justify their support for the theory of evolution. The picture of scientific knowledge that emerges in statements made in this argumentation line is that it is objective and proven; and free of belief, personal feelings or values (see also Gilbert and Mulkay, 2003; Cook et al., 2004; Burchell, 2007).

For education in science this meant that teaching scientific knowledge means primarily teaching "facts" that have reached the status of consensus among the professionals of the scientific community alongside the processes – the scientific method – for obtaining them (see Chapter 2, Section 2.2.1.-2.2.2.).

In various cases reference is also made to peer review as a means of quality assurance in scientific publishing; scientific experts have to check on the work of other scientific experts before their results will be publicised. Here it is a certain group of people with expert knowledge – the "scientific community" – that decides what passes as correct and convincing, valid and reliable knowledge that is deemed to be "scientific" (e.g. in Burkeman and Jha, 2003, April 10; Connor, 2003, September 4). Concerning controversial issues in the public sphere, some scientists suggest consulting "the very best scientists" to separate scientific facts and uncertainties, "which frame the debate, from policy choices, which, guided by public opinion, can often involve values, feelings and beliefs" (May, 2002, May 19). This recourse only to scientific expertise and facts to resolve disputes is a reminder of the deficit model of science communication (see Chapter 2, Section 2.1.1.).

The activity of "doing science" is in this regard left to a specialized professional community. The scientific community is not open for everyone's participation. Acknowledgement in the scientific community must be earned through a successful

enculturation process into the scientific community (e.g. Delamont and Atkinson, 2001; Roth and Bowen, 2001; Campell, 2003). Consensus about controversial issues that is reached by the professional community of scientists is of special importance and comes, in the view of some of the scientists in this group, as close to an objective truth as it can get. The scientific experts arguing against creationism (and/or for teaching the theory of evolution) are addressing the scientific dimension of the controversy and what should and should not be taught in science education (see Section 4.2.1.). In doing so they used the debate around Emmanuel College as an important space for boundary work: Firstly they addressed was should and should not count as science in the science curriculum (science should be taught as fact and religion and controversy do not belong in the science classroom) and secondly they used the newspaper reports that represented their view to re-emphasize the notion that science is epistemologically superior to other accounts of explaining the world.

These scientific experts were either framed by title, institution and discipline alone which indicated a form of professional expertise, or further credibility was added by descriptions that underlined, for instance, leading expert status in the professional field or international recognition of the expertise of the scientific expert. In this group no description were found that challenged the expert status in a direct way.

4.3.3. b.) *Scientific experts challenging the epistemological status of the theory of evolution*

There were three cases of scientists in the sample that challenged the scientific validity of the theory of evolution. This is the example of Andy McIntosh that relates to the controversy around Emmanuel College:

"[...] Andy McIntosh, professor of thermodynamics and combustion theory at Leeds University, said: "Education should be analytical not dogmatic, particularly when dealing with science.

"I am surprised that other scientists would only support teaching and learning in Darwinian evolution. My colleagues and I want schools to teach children how to think - not what to think."

Professor McIntosh said: "Creationism should not be immediately excluded, neither should evolution. The two need to be considered carefully.

"You have to have open discussion, whether it is equal discussion we are not saying. What we are saying is that there should be discussion in the classroom.

"You need to have an open mind and to consider the data carefully, and that doesn't mean that you exclude philosophical views.

"The issue is to support critical thinking with credible argument - there is a great deal of evidence suggesting that evolution is not the best explanation."" (quoted in: Dean 2002, April 26: 14)

Andy McIntosh was described as professor at Leeds University which established the credibility of a professional scientific expert. McIntosh's argument why creationism should be considered in science education was also presented in a "scientific" rhetoric just like the arguments of the scientific experts arguing for the opposite case before. At the end of the quote he pointed to the role of evidence in the process of explaining matters scientifically. Here he also referred to "the scientific method" of investigating the laws of nature. In order to learn how to think children must be confronted with various approaches and ideas. This argument also mirrors the pluralist informed choice argument made by the Emmanuel College educators. The implication that followed for him was that creationist theories should be considered alongside the theory of evolution in science education allowing children to make up their own minds.

There were two more cases in the sample (Burkeman and Jha, 2003, April 10; Connor, 2003, September 4) where scientists were quoted challenging the epistemological status of the theory of evolution as well as the evidence backing the theory. However, both cases referred to the controversy in the United States around "Intelligent Design". Both cases are interesting examples of how the perception and credibility of experts can be challenged

through framing the scientific expert in a particular way. Here it is suggested that the use of expert sources can influence the tone of an article about a controversial issue in two ways (Allgaier, 2004).

First, by selecting certain quotes and leaving out others journalists represent a mediated view of the debate. This is the case with a scientist challenging the explanatory power of the theory of evolution quoted in Burkeman and Jha (2003, April 10: 4). Here is how they quoted Michael Behe:

> ""It's not that I don't think Darwinian evolution can't explain anything," says Professor Michael Behe of Lehigh University in Pennsylvania, the [Intelligent Design] movement's foremost academic advocate, when asked how he accounts for the very visible evolution of, say, viruses. "It's just that I don't think it can explain everything. Bacterial resistance to antibiotics, for example, is one of the things it can explain.""

Michael Behe was introduced as professor of a US university and leading advocate of the Intelligent Design (ID) movement. A couple of paragraphs before the ID movement was described by Burkeman and Jha as "religious dogma masquerading as science". In attacking the theory of evolution ID had had an "overwhelming lack of success". This description framed the quote in particular way and implicitly points to the consensus view in the scientific community that rejects the ideas of Intelligent Design. Furthermore, the quote that was selected by the authors of the article did not challenge the theory of evolution but actually addresses the example of bacterial resistance that can be explained through evolution. Effectively, this quote was therefore used to back the validity of the theory of evolution without explaining or mentioning Behe's actual criticism about what he thought the theory of evolution could *not* explain.

Second, by contesting the credibility of an expert in the description of the expert source that is attached to the quote, journalists frame these experts in particular ways. This can affect the perceptions of their argument. For example, in an article by Connor (2003, September 4: 5) about the case of the peppered moth and industrial melanism as evidence

for the theory of evolution the scientific expert Jonathan Wells is quoted the following way:

"Jonathan Wells of the University of California at Berkeley, who receives funds from the Discovery Institute in Seattle - which promulgates creationism - cited Coyne in his critical onslaught. "The classical story, elegant and appealing though it may be, should no longer be presented as a textbook example of evolution in action. If the purpose of science education is to teach students how to do good science, then instead of retelling the classical story, textbooks would do better to focus on how science revealed its flaws," Wells wrote." (Connor, 2003, September 4: 5)

The argument Wells makes is consistent with the rhetorical strategies and structure of the arguments of the other scientists. It acknowledges the idea of a "scientific method" and refers to Popper's (1959) falsification principle when he suggests that texts should focus on how scientific hypotheses improve. This principle was also used to demarcate science from non-science[28]. If experiments turn out to be flawed (in this case Wells is talking about the example of the peppered moth and industrial melanism) they should be rejected. The notion of science education that is expressed in this quote is to teach the process of arriving at valid knowledge as a means of teaching good science. It also suggests that teaching about the nature of science can help the students to distinguish "flawed" science from good science. The implication is that retelling a science story that is known to be "flawed" is unacceptable. In this sense also the quotes of the scientific experts in this category refer to curriculum issues and the question was should be taught in science education (Section 4.2.1.).

In Wells' case it was the description of him by the journalist that could frame the quote in a certain way. Before Wells' quote, the topic of the article is about a "creationist mill" that would grind up the results and outcomes of the hardworking scientists and which wouldn't

[28] Gieryn (1999: 28) notes for the US context: "Popper's falsifiability later turns up in court as a coordinate used to locate creationism not in science but religion (no observation could challenge the inerrancy of the Bible, it was suggested by those inclined toward evolution)."

understand the business and advancement of the scientific community. Directly after this part of the article Wells was described in a way that might challenge the credibility, namely as a researcher receiving funds of an institute that advances creationist views. The implication (and what mattered) seemed to be that Wells received funds from a creationist institute. And the conclusion that possibly followed for readers is that a person that received money from somebody – who is a creationist and sees it as his or her mission to spread creationist ideas – was probably at least to a certain degree dependent on his or her sponsors (an argument similar to that made about City Technology Colleges).

In this example the journalists had the power not only to select certain quotes and to leave out others but also to frame expert source descriptions in a particular way. Alternatives in depicting sources and highlighting certain aspects or features of them are always possible, e.g. in Wells' case an internet search revealed that he is developmental biologist and has a Ph.D. in theology from the respected Yale University and recently completed a second Ph.D. in molecular and developmental biology at Berkeley, studying early amphibian development[29]. These features would have also allowed a portrayal of this source as a credible and qualified scientific expert, affiliated with two prestigious scientific institutions, should a reporter have wanted to depict him as such. However, none of Wells' academic titles were mentioned in the article.

Journalists have a range of options of describing expert sources and frame their quotes not only in a favourable light that might enhance their credibility as the previous discussion of scientific experts shows (4.3.3.a.) but can also employ means of challenging the credibility of expert sources.

Both articles that challenged the credibility of quoted scientific experts (contesting the theory of evolution) were written by correspondents or editors that specialised in science stories.

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[29] Access Research Network: http://www.arn.org/docs/orpages/or161/wells.htm (last checked 25 July 2007).

### 4.3.3. c.) *Scientific experts arguing that religious and scientific accounts do not contradict each other*

There are also four cases of scientific experts in the sample that do not see necessarily a conflict between science and religion (e.g. in Swain, 2003, May 9). A very small minority of scientific experts in the sample therefore explicitly opposed the view that science has to be atheist in nature or that scientific investigations come to the conclusion that there can be no god(s). Hence, science and religious beliefs can (and indeed do) co-exist in society and also within individuals (see Chapter 1).

These arguments were also expressed in the form of a scientific argument in a "scientific" rhetoric, as this example of Sir Gabriel Horn, described as "head of zoology at Cambridge University", illustrates:

> "I see nothing incompatible between the teaching of science in schools and belief in the existence of God. Scientists seek to understand the universe ... through observation and experiment. Science is an empirical discipline. So far as I am aware, no empirical tests have been devised that provide compelling evidence to refute the existence of a God." (quoted in: No byline, 2002c, March 15: 11)

Horn was described as a credible scientific expert in a leading position at the prestigious University of Cambridge. His view opposes the view of the scientists arguing for science having to be purely atheistic in nature. In the same way as the other scientists Horn emphasised the method(s) of science namely "observation" and "experiment" and stresses that science is an "empirical" discipline to make his very different point that scientists could not prove that God does *not* exist. Therefore he does not see an incompatibility between science education and the belief that God exists but portrays science as a professional activity that simply could not answer the question about God. In this view Horn's quote opposes the view of scientism, the idea that scientific explanations are superior, not only in explaining nature but also in explaining cultural and social

phenomena (see Chapter 1). However, the quotes in this category also referred to the issue what should or should not be taught in science education (4.2.1.).

In the case of scientific experts arguing for a reconciliation or peaceful coexistence of scientific explanations with religious approaches the experts were described by title, institution and discipline and further credibility was added by descriptions that underlined, for instance, leading expert status in the professional field, as in the following example in Swain (2003, May 9: 21):

"By subjecting the Bible to the academic rigour that has made him one of the UK's leading materials scientists, Colin Humphreys replotted the route of Exodus. [...]

Not that Humphreys, a committed Christian, is averse to hymn singing. But as professor of materials science at the University of Cambridge, he is used to asking questions and finding solutions."

In this description the credibility of Colin Humphreys, a scientific expert who thinks that science and the Bible are both "true", is enhanced by describing him as one of the leading experts in material science in the UK, a committed Christian (compare this to descriptions of other believing experts as evangelical, fundamental or right wing) and professor at the prestigious University of Cambridge who is used to "asking questions and finding solutions". In the category of scientific experts that argue for reconciliation or peaceful coexistence between science and religion (none of the scientific experts in this category challenged the teaching of and/or the theory of evolution) no descriptions were found that challenged the expert status of these quoted experts.

### 4.3.4. NGOs, campaigners and action groups

56 of the experts in the sample belonged to non-governmental organisations (NGOs), campaigners and action groups. Also in this category different argumentation lines were

found. Here, three different groups emerged from the coverage (two quotes did not fit any of the categories):

a.) Arguments that criticize religion in education (21 quotes)

b.) Arguments that defend or support Emmanuel College (19 quotes)

c.) Arguments that describe the theory of evolution as a materialist worldview (14 quotes)

The arguments of the first category of arguments criticizing religion in education were made on behalf of secular and humanist organisations, as well as by action groups of parents against Vardy-sponsored schools (21 quotes - 37.5 %). The second category of arguments defending Emmanuel College were mainly made by Sir Peter Vardy or representatives of the Vardy Foundation (19 quotes - 33.9 %). The third category of arguments attacking the theory of evolution as a materialist dogma were from representatives of creationist organisations (14 quotes - 25 %).

In what follows each argumentation line will be described and some illustrative examples will be given.

### 4.3.4 a.) *Arguments that criticize religion in education*

21 quotes argued against the influence of religion in education. There were 17 secular and humanist groups cited in the coverage, for instance the British Humanist Association or the National Secular Society. (Four quotes refer to petitions by humanist and/or secular campaigners which will be further investigated in section 4.4.) Both of these groups were linked to some of the previously mentioned scientists that were arguing against the scientific validity of creationism (see 4.3.3.a.). The humanist and secular organisations themselves were arguing against all forms of religion in general and the teaching of creationism in particular. Related to the controversy around Emmanuel College their

concern was similar to that of the teaching unions – that religion influences the education of young people. These organisations consequently condemned the teaching practice at Emmanuel College, and also attacked the credibility of its staff and its sponsor. Other targets were faith schools in general, religiously motivated sponsorship in education, and the educational policy of the Prime Minister (who backed Emmanuel College) and the Labour government, as illustrated in this example:

> The National Secular Society has written to Estelle Morris, the [then] Secretary of State for Education, asking for all religious teaching to be "specifically excluded" from the national curriculum. Keith Porteous Wood, the executive director, said: "Creationism is anti-science and it is an abuse of children's burgeoning intellect to teach them it is as credible as evolution. We fear Mr Blair's enthusiasm for 'faith schools' will result in more of this kind of nonsense being taught in our education system.
> "If such teaching is deemed acceptable by the Government, this will give the green light for every crackpot religious group to start peddling their own mad fantasies in schools paid for by the taxpayer."
> (Cassidy, 2002, March 19: 10).

In this and all other quotes members of secular or humanist groups were described by their function in their groups or just as members of these groups, which neither challenged nor enhanced their credibility. In this quote Keith Porteous Wood attacks creationism as being "anti-science", a danger to impressionable young minds and close to "crackpot religious groups". Proponents of teaching creationism are described as advocating off-the-wall beliefs that are not only non-scientific but in this regard opposed to rational thought. Wood is defending the boundaries of science and his sympathies are clearly with the scientific experts arguing for the theory of evolution as the only valid explanation, which he describes as being more credible than creationist views. In the quote he personalizes the debate by blaming the Prime Minister and his enthusiasm for faith schools for creationism being taught in schools. In this regard it is the government that is accused for "anti-science" theories being taught in science education. Other quotes by experts in this group used similar arguments and stated, for instance, that teaching creationism is the same as

teaching "that fairies exist, or that the moon is made of green cheese" (in Purvis, 2002, March 24: 16). They also addressed the responsibility of the government in providing an education free of religious thought. There were no descriptions in the sample that challenged the credibility of representatives of humanist or secular groups. Their arguments addressed several of the controversial issues, for instance what should be taught in science classes (Section 4.2.1.) and the policy of City Technologies Colleges (Section 4.2.2.).

Another group in this category were the quotes by four representatives of parent action groups who argued against Vardy-sponsored schools. The main theme is here that the parents fear religious "indoctrination" of their children, for instance:

"[...] one parent member of the action group said: "We have been misled and let down by the local education authority. We don't like this evangelism. We don't want our kids brainwashed.""

(quoted in: Brayshay, 2002, May 24: 11)

One other argument of the representatives of parents' action groups is that parents who chose to send their children to faith schools made a deliberate choice to expose them to religious belief. In contrast, parents who send their children to Vardy-sponsored school will be exposed to religious belief without having this choice, since these schools replaced alternatives in the region. This directly opposes the argument of the Emmanuel College educators that the education at the school will enable the children to make informed choices about what they want to believe. In the view of the parents' action group the children at the school will be involuntarily exposed to religious. For the representatives of parents' action groups it was clear that it was the mission of the religious sponsor Sir Peter Vardy to make children interested in religious belief and that this was also the reason why he sponsored schools. Here it was claimed that the Vardy Foundation was interested in "brainwashing" and "indoctrinating" children with religion. The main issue in this category

is the policy of City Technology College and private sector involvement in education (Section 4.2.2).

4.3.4.b.) *Arguments that defend or support Emmanuel College*

19 of the quotes in the sample were either by Peter Vardy or representatives of the Vardy Foundation. These were backing the school for its good results and the openness of its approach. Of these Peter Vardy played a central role as private sponsor in the newspaper coverage of the controversy around Emmanuel College (see Section 4.2.2.). Vardy received a knighthood for services in education in 2001 (e.g. Branigan, 2002, March 9). Several articles were published with the focus on Peter Vardy (and his financial success), for instance *The Sunday Times* described Vardy as 669th in the *Sunday Times* Rich List 2001 and it was mentioned that his forthcoming entry will put him even higher up the list with a personal fortune of 75 million pounds (Hackett and Waterhouse, 2002, March 17). In the beginning of this article he was depicted as "multi-millionaire car dealer and creationist evangelist" who is offering 12 million pounds to help fund a network of state-schools (Hackett and Waterhouse, 2002, March 17). The descriptions of Peter Vardy in the sample varied from "multimillionaire entrepreneur behind the Reg Vardy car dealerships" and "evangelical Christian" (No byline, 2002b, March 9) to "Tycoon Sir Peter Vardy, a creationist evangelist" (Lepkowska, 2003, March 19) who is "creating his own education empire" (Morrison, 2003, August 18) to Vardy being "one of Britain's most generous men" (No byline, 2002, April 8).

Sir Peter Vardy donated two million pounds to Emmanuel College and it was announced in the coverage that he was going to fund further schools (e.g. Shaw, 2003, May 30; Norfolk, 2003, April 28). Several articles suggested that Vardy's personal educational level is rather low: he left school at 16 with one O-level (e.g. Branigan, 2002, March 9). These descriptions could both challenge or enhance his credibility as the sponsor of Emmanuel

College. In the quotes Vardy repeatedly insisted on being a Christian believer but not somebody who teaches creationism in school or cares about the scientific status of creationist ideas, for instance:

"I don't know what a creationist is. I am not a scientist. I am a car salesman. [...] My opinion is God created man in his own image and I believe that God created the Earth, but I am not teaching that at the school – that is my particular belief." (quoted in: Hackett and Waterhouse, 2002, March 17)

However, there were some descriptions of Peter Vardy in articles that indicated that he is a convinced creationist that questions the scientific status of the theory of evolution, for instance:

"Vardy insists that there is scientific evidence questioning the theory of evolution and that it is "an open debate". He says: "At the college, we teach both theories so that young people can make their own minds up."" (McCurry, 2003, July 9: 4)

Descriptions such as those by McCurry (2003, July 9) that claim that Vardy insists that there is an open debate about the scientific status of the theory of evolution involving scientific evidence against it (which he did not say in any of the quotes in the sample) seem to challenge the credibility of Sir Peter Vardy as a sponsor of state-funded schools. Unsurprisingly, the statements by Peter Vardy and on behalf of the Vardy Foundation were generally very similar to those brought forward by Emmanuel College sources and especially by Nigel McQuoid, for instance:

"I believe that God created the Earth and he created man in his own image," he says. "There are an awful lot of folks that believe in creation, and what we seek to do here is reflect a broad education, so in RE we tell them about creation, and in science we tell them about evolution. That is a rounded education.

"It is very narrow minded to teach evolution and not creation, and it is very narrow minded to teach creation and not evolution. Here, they get both." [...]

'It was all blown out of proportion - you would think we were part of the Ku Klux Klan the things people say about us," he says. "If anyone is indoctrinated it is them outside," he waves dismissively, "they're walking around like robots. We really have been attacked unmercifully and unjustly. It is demoralising, when I'm trying to do the best for the children and make a difference, and I'm getting pilloried by the Press."
(quoted in: Morrison, 2003, August 18: 10)

Vardy (in the same way as McQuoid) stressed the openness as well as the open-mindedness of the college and (in other quotes) the good results it achieves. Indoctrination, he said, was not taking place at Vardy-sponsored schools since they offered children various choices of what to believe and it would be up to the children to make up their minds.

The reason for Peter Vardy to get involved in education was the benefit of the children and not the dissemination of particular worldviews. Vardy suggested that if indoctrination was taking place then it was taking place "outside" the college. At Emmanuel College, children were confronted with different approaches and allowed to chose which they find convincing.

This argument mirrors the informed choice argument that is also used by the other Emmanuel College educators. Peter Vardy showed himself very frustrated with the way the public controversy around his involvement in education sponsoring had developed and said that his foundation and Emmanuel College were "unmercifully" and "unjustly" attacked. Here, he pointed particularly to the press coverage when he said "I'm getting pilloried by the Press".

OFSTED inspectors were also invited by Vardy to visit the school again since he thought the foundation and the Emmanuel College were doing nothing that is "wrong" or could cause any problems. The wellbeing and what's best for the children at the school is mentioned more than once as the reason for the financial involvement of his foundation in education. But Vardy also said that he saw it as his personal responsibility to give something back to the communities in which he runs his businesses. However, the way

Vardy was described by the journalists in some of the articles in the sample could challenge his expertise in education, his credibility and the legitimacy of his involvement as a sponsor in education. Quotes by experts in this category addressed various issues of the controversy but focused on the policy of City Technology Colleges and sponsorship in schools (Section 4.2.2) and the role of education in society (4.2.2.).

4.3.4.c.) *Arguments that describe the theory of evolution as a materialist worldview*

There were 14 quotes in the sample that promoted different forms of creationism. (One quote referred to a petition by a collectivity of creationist campaigners which will be further investigated in section 4.4.). These quotes were made on behalf of creationist organisations. They generally supported the idea that creationist explanations can be seen as scientific theories and are no less scientific than the theory of evolution. They argued that creationism should also be taught or considered in science education (e.g. No byline, 2002, March 15). Consequently most of them supported Emmanuel College for teaching creationist theories in science classes (e.g. Branigan, 2002, March 25). In some quotes it was said that believers face obstacles in academia not because of their competence but because of their belief (e.g. Campell, 2003, February 1).

The theory of evolution was challenged and presented as dogma or political ideology in some of these quotes. The following is a quote from the website of John Mackay who was described as "a fundamentalist Christian with links to the Australian-based Creation Research organisation" (Branigan, 2002, March 25: 9):

"On its main website, Creation Research complains that the media and schools have "indoctrinated (people) with evolutionary humanism, with ape-men, and billions of years of change which denies creation, the Bible and Christ." Its UK website appears to blame a belief in evolution for the attack on the World Trade Centre on September 11, commenting: "Believers should not be surprised when things like this happen . . . The root cause of this increasing violence is sin - sin which is rooted in the refusal to glorify The Lord as the God who

created the universe. "In recent western culture this refusal has been built around evolution and the denial of a god of any sort.""

The description of John Mackay as "fundamentalist Christian" might challenge his credibility. In the quote Mackay describes the theory of evolution as a humanist worldview that "denies" Biblical accounts of creation. Sin is equated with evolution and the denial of any supreme beings, which represents the view of fundamentalist Biblical creationists (Chapter 1). In this account evolution is much more than a scientific theory; in a causal relationship Mackay relates the theory of evolution to the refusal of god which leads to sin and later on to violent incidents (such as the 9/11 terrorist attacks). A consequence that follows for the believer is that evolution may not be scientifically but morally wrong and lead to moral, cultural and social decay. In this account "truth" and the right way to live is found in the Bible and nowhere else. Mackay also claimed that the media and (secular) inculcate citizens with an atheist version of the theory of evolution (evolutionary humanism). "Indoctrination" in this view is therefore not taking place at Emmanuel College but in secular schools and the media (an argument similar to the one Peter Vardy made in the previous section).

As mentioned in the section of Emmanuel College sources (4.3.2.a.) some creationists claimed that they were excluded from the scientific community because of their belief. In some other cases creationists also used a scientific rhetoric and tried to present themselves as scientific experts in order to attack the validity of and evidence for the theory of evolution, as in the following example. Andrew Forbes who was described as "a supporter of fundamentalist Christian organisations that believe scientific evidence shows the theory of evolution is wrong and that the Earth was created by God 6,000 years ago" is quoted in Farrar (2002, March 22: 1) in the following manner:

"Mr Forbes told the THES that researchers in the life and earth sciences were being targeted to provide information for scientists, "many of whom used to accept evolution as a tenable theory but now have grave doubts".

Mr Forbes, who is director of London-based educational company Affinity Membership Services, said responses included some against evolution. "People are so dogmatic in their views over Darwin that there's almost a conspiracy to stop open debate. If we're honest scientists, we have to look at all the possibilities.""

Forbes was described as being close to fundamentalist Christians that deny the consensus view of the scientific community. In the quote Andrew Forbes suggested that scientists that accept the theory of evolution are dogmatic and trying to censor debate on origins. Forbes described himself as an "honest" scientist who is considering more possibilities than the dishonest scientists who "only" believe in evolution. He also suggested that the number of "scientists" who used to believe in evolution and are now having "grave" doubts is growing. Here is also a link to being morally right (honest) and the duty of considering other option than the theory of evolution. Forbes also claimed that scientists are avoiding "open" debate on origins. To a degree this also mirrors the informed choice argument of the Emmanuel College educators and Peter Vardy: In order to find the truth and make an informed choice one has to know and consider all possibilities. In Forbes view it is the creationists who are open to debate and the (atheist) scientists who censor and restrict their fair discussions. In this sense Forbes is also referring to the norm of scepticism in the conduct of science (one of Merton's (1973) CUDOS norms – see Chapter 2, Section 2.1.1). Here he (and other creationists in that regard) infers that creationist scientists would be the "better scientists" because they scrutinized the theory of evolution (and evidence for it), whereas the majority of (materialist) scientists would threat this as a sacrilege and would therefore not dare to challenge the theory.

The way Forbes was described could potentially challenge his credibility. However, a look at the whole article suggests that the way the article was constructed challenges the credibility of what Forbes is saying even further. The quote by Forbes is countered with

quotes by four credible scientific experts and another scientific expert that is also an ordained priest that are all quoted arguing against Forbes' point of view. Here it is the sheer quantity of accounts by further experts with high credibility against Andrew Forbes that challenge his credibility and the credibility of his account.

In this section two different ways of how the credibility of experts could be challenged were identified. Some of the descriptions could challenge the credibility of the expert sources. Furthermore, an account of an expert source could also be countred with a multitude of opposing accounts by credible experts and as a result the article will not be balanced (the issue of balance in quoting expert sources is further investigated in Chapter 5). The issue in the quotes of this category is mainly the question of whether creationism or the theory of evolution is "true" and what should be taught in schools (Section 4.2.1.) but also the issue what is the "morally" correct view.

### 4.3.5. Politicians, officials and authorities

This category contains 40 politicians and spokespeople of authorities. It is dominated by Prime Minister Tony Blair's comment (quoted 12 times) in Parliament in which he backed Emmanuel College for its good results, stressing that newspaper accounts on what the school is teaching were exaggerated and that diversity in education should be welcomed (Section 4.1.1.). Several descriptions of Tony Blair stressed his religious belief (the other experts in this category were described only by name and/or title), for instance:

"The Prime Minister is very enthusiastic about them [faith schools] - he is a committed Christian, and he sends his three children to Roman Catholic schools (all with good academic records)."

(Amory and Mintowt-Czyz, 2002, March 15: 8)

Compared to the descriptions of other experts (for instance as fundamentalist or evangelical) this description cannot be seen as challenging his credibility as Prime Minister.

Liberal Democrat Jenny Tonge, who asked him about the teaching of creationism at a state-funded school came second with seven quotes.

Furthermore, all statements made on behalf of OFSTED (4 quotes) or the Department for Education and Skills (5 quotes), as treated earlier (section 4.3.2.), were to be found in this category.

Also, Lib Dem Education spokesman Phil Willis was quoted two times attacking the credibility of OFSTED and the educational competence of the government:

"Mr Willis said he had no wish to ban discussion of the biblical account of creation. "However, it is unacceptable to allow creationism to be taught as 'superior' when teaching science in state schools.

"It makes a mockery of current scientific knowledge built on the principles of hypothesis, research and peer evaluation. Is this really what science teaching should be about? I have to ask why did OFSTED not pick up and challenge such fundamentalist views?"

Mr Willis said the debate went to the heart of the Government's policy on diversity in state schools and its "love" of private sponsorship, because Sir Peter Vardy, who part funded Emmanuel and chairs its governors, was planning to set up six city academies." (O'Leary, 2002, April 1)

Willis referred to the arguments of scientific experts when he explained the principles of scientific knowledge and challenged the competence of OFSTED for not challenging creationist views in science teaching. Here it is noteworthy that the political expert Willis challenges the credibility and competence of OFSTED, another quasi political organisation. He criticizes the OFSTED inspectors for not objecting to creationism being taught as a better alternative to the theory of evolution (what had been reported in the newspaper coverage before).

Willis also challenged the government policy of City Technology Colleges (and the extension of this policy) and suggested that the government's affinity for private sector

involvement was responsible for "fundamentalist" views in science classes at state schools. In this regard the quote by Willis mixed different issues of the controversy, for instance curriculum issues (Section 4.2.1.) and the policy of City Technology Colleges (Section 4.2.2.) but especially the report written by OFSTED (4.2.3.).

Moreover, US President George W. Bush was quoted three times saying that it is still not certain how god created the Earth (e.g. in Phillips, 2004, February 13). The remaining seven quotes are from other individual politicians and spokespeople of authorities. The experts in this category are described only by their political function or as spokespeople of authorities. These descriptions do not add or challenge the expertise of the quoted experts.

### 4.3.6. Religious experts and institutions

The sample contained 31 quotes from religious experts, institutions and clergy. Most quotes were from the Bishop of Oxford Richard Harries (five quotes), the Bishop of Durham Michael Turnbull (four quotes), and religious texts, such as the Bible (three quotes). Here the controversy was discussed in religious terms, for instance the role religious faith had to play in education and society in general was discussed (e.g. Bates, 2002, April 11; Petre, 2003, September 12), or if literal interpretations of Biblical creation stories were good theology and religious scholarship or not (e.g. Pyke, 2002, March 17). Some of the religious experts and clergy also attacked the teaching practice at Emmanuel College because in their view Biblical literalism would not only bring the Bible but also Christianity itself into disrepute (e.g. Branigan, 2002, March 16). Only a few backed the school (e.g. in Herbert, 2002, March 15).

Most religious experts and clergy did not see religion and science in competition but explained that they both tried to answer entirely different questions; for instance, that the sciences answer questions about *how* natural processes take place, whereas religions ask *why* these processes happen at all (e.g. in Maddox, 2003, February 7). There is one case of

a religious expert that attacked the theory of evolution: Reverend Richard Harrison, who is described as “a Baptist minister who calls evolution "a hoax"” (all other religious experts in the sample are only described by their function or title).:

“Mr Harrison, who is based at the Crane St Baptist church in Pontypool, said that Nigel McQuoid, principal of the Gateshead school, had been due to visit Torfaen over Easter but had changed his mind because of the creationism row.

"I'm still in touch with the Vardy Foundation, but can well understand that in the present climate they cannot possibly come here and we now need to stand up for ourselves," he said. "They have awakened us to the possibilities." He added: "I think it's time that the teaching of evolution as a fact were challenged. Okay, it's a plausible theory, but it's a hoax.

"If you bring up a generation and teach them that they've evolved from primordial swamps, soon you will develop a generation that is totally self-centred and liable to erupt into mindless violence.””

(Branigan, 2002a, April 9: 7)

The description introduced the religious expert as a clergyman who thinks the theory of evolution cannot be taken seriously at the beginning of the article.

This quote refers to the public controversy around Emmanuel College and Harrison shows his understanding that the Vardy Foundation cannot come to his place “in the present climate”. His argument about evolution is similar to the argument of some Emmanuel College experts (4.3.2.a.) that the theory of evolution is one just (plausible) theory among many. The next line in the quote also points to the moral implication of teaching the “hoax” called evolution. Teaching evolution is described as being unmoral and selfish and the reason why sin and violence can become prevalent among human beings. This is an argument that is very similar to the statements of the creationist organisations that declared the theory of evolution as an atheist dogma, responsible for causing sin (4.3.4.c.).

### 4.3.7. Parents and pupils

20 quotes in the sample were from pupils or parents. Here it is noteworthy that all parents of children at Emmanuel College (eight quotes) and other Vardy-sponsored schools and also the pupils themselves (eight quotes) supported the school(s) for their very good results and their very efficient and successful education (e.g. in Smith, 2003, December 12). For instance:

"People think we're robots," complains 15-year-old Rachel Miller. "We don't get brainwashed at all - we get taught the facts, and it is up to you whether you believe it or not."

"Sometimes it gets a bit annoying when people prejudge you," adds Steven McFarlane, also 15. "People think we carry around three Bibles and say 'God is good', but we don't."

(quoted in Morrison, 2003, August 18: 10)

This quote suggests that also the children at the school were aware of the allegations that they were "indoctrinated" at the school. The pupils quoted in the sample opposed these allegations. It is also noteworthy that the first quoted pupil referred to the informed choice argument by stating that they are confronted with the "facts" and that it was up to them to make up their minds about the "facts". In this sense the pupils followed the informed choice argument of the Emmanuel College sources.

Further quotes were from parents or pupils in the US context. Parents and pupils were described as parents, pupils or student of the institution they are attending and their descriptions did not challenge or enhance their credibility.

### 4.3.8. Media professionals

There were four media professionals quoted in the coverage. They were described by their name and sometimes the newspaper they were writing for but without further qualifying descriptions. The statements of the media professionals varied in their substance but they

all pointed to the self-referential nature of the mass media (Luhmann, 2000), since the quotes were all comments on issues that were reported by the media before. They generally served in the article as quotes to be commented on by the authors of the articles, who were, again, media professionals themselves. This suggests that media professionals follow(ed) the coverage of other newspapers and media outlets.

Kitzinger (2000) argues that the practice of media professionals reading and referring to the work of other media professionals can have the effect of a (re)construction of meaning over time. That means that the way how issues were framed or approached in previous media coverage are likely to be repeated in further coverage by media professionals

### 4.3.9. Summary

It was shown in this section that the views and arguments among education experts, scientific experts, NGOs and action groups, politicians, officials and authorities, religious experts and clergy, and parents and pupils differed as to whether they thought Emmanuel College and its teaching practices should be supported or not. It was also pointed out that different groups of experts contested different aspects of the controversy and used a range of different arguments about the several controversial issues of the controversy. This analysis suggests that it is not sufficient to examine solely the distribution of different types of expert sources but that an investigation of their actual arguments is more effective in investigating which issue(s) the various quoted experts sources in the newspapers addressed and what they said about it. The findings of this analysis also showed that media professionals played an active role in mediating debates, not only in the selection of experts, but also the way they described and framed quotes of particular expert sources that could enhance or potentially challenge their credibility.

In this section it also emerged that various groups or subgroups of experts shared similar concerns or issues with experts of other expert categories. In other words the picture that

arises from this analysis is that there are disputes between different and the same categories of experts but that experts from different categories of experts also form coalitions and use similar arguments. The next section is therefore going to have a closer look at the different groups and coalitions that appeared in the coverage, what kind of experts met in these groups and what their common issues were.

### *4.4. Coalitions and collective expertise*

It was already mentioned in previous sections that several collective calls for action were made in the course of the controversy and that they played an important role in the controversy. Moreover, action groups formed and letters and petitions, signed by various experts, were sent to officials and representatives of the government. These calls for action and petitions received news value in the controversy and were reported but also led to further developments and actions in the debate.

However, experts did not only come together in concrete action groups that signed petitions. There were also links between different experts of different expert categories through the arguments they make and the common goal(s) they pursue. The literature on experts in controversy contexts therefore recommends investigating these links between experts (e.g. Limoges, 1993; Irwin and Michael, 2003 – see Chapter 2, Section 2.1.1. – 2.1.2.).

This section examines how various groups emerged in the press coverage; what kind of experts joined the groups and what the issues were for the different groups. This analysis presents how the coalitions emerged chronologically in the coverage and explains discursive connections (i.e. through the arguments they make) between quoted experts as well as manifest calls for action by various signatories that come together in order to address certain issues of the controversy in petitions.

The analysis presented in this section is based on the newspaper articles published during the sample period alongside supplementary data generated through searches of online databases, archives and the internet. It therefore investigated the newspapers articles of the sample but also letters; petitions and web pages of organisations and ad hoc groups (see Chapter 3, Section 3.2.5.c. and Section 3.4.).

As result of this analysis three classifications describe the groups that emerged from the coverage related to the controversy around Emmanuel College and the teaching of creationism and the theory of evolution:

1. Organisations, groups and actors liaising against Emmanuel College and the teaching of creationism in science classes
2. Emmanuel College, the Vardy Foundation and their supporters
3. Organisations and individuals arguing that faith and science do not oppose each other

These three groups will be described in more detail in the following sections.

### 4.4.1. Organisations, groups and actors liaising against Emmanuel College and the teaching of creationism in science classes

On 14 March 2002 an article on the front page of *The Guardian* (Branigan and White, 2002, March 14) reported that "leading scientists" such as Steve Jones, a geneticist of University College London; David Colquhoun, Professor of Pharmacology at UCL; Peter Atkins, Tutor in Physical Chemistry at Oxford; and the Oxford professor Richard Dawkins called on OFSTED to re-inspect Emmanuel College because Christian teachers there did not believe in evolution and were undermining the scientific teaching of biology (see 4.1.). Furthermore, it was reported that the appeal for re-inspection was backed by the aforementioned Dr Jenny Tonge (see 4.1.1.). It was also reported in another *Guardian*

article that "leading philosophers", including Jonathan Ree and Professor David Papineau had signed a British Humanist Association petition which urged the government to clarify the wording of the National Curriculum so that teachers cannot present creationist theories as the scientific equivalent of evolution (Branigan and White, 2002, March 14; Clancy, 2002, March 15; 2002, July 26). The National Secular Society was quoted condemning Mr Blair's comments as unfortunate acceptance of anti-science (Branigan and White, 2002, March 14; Kallenbach, 2002, March 14).

In a news report by Herbert (2002, March 15) the Bishop of Durham Michael Turnbull joined the growing debate about Emmanuel College. Turnbull was quoted saying that it was possible to teach children a variety of views of creation and that the good academic results of this school suggested that pupils were not brainwashed but taught to think. Nonetheless, he backed calls for a re-inspection of the school for a clarification of the issue (He thought Emmanuel College was doing nothing wrong). Bishop Turnball is an odd case since he actually backed Emmanuel College and called for a re-inspection of the school (see also O'Leary and Jenkins, 2002, March 15).

Branigan (2002, March 16) reported that the Bishop of Oxford Richard Harries attacked the way the issue of creation and evolution was handled at Emmanuel College. Harries expressed his dismay with the school's approach on Radio 4's "Thought of the Day" slot on 15 March 2002[30]. The fact that the newspaper article mentioned that the quote stems from a radio programme points to the intertextuality of media content (e.g. Hawkes, 1992). It follows that journalists covering the issue also followed media coverage in other media outlets and quoted from these other accounts if they considered it relevant for their reports. Further clergypersons, Rev Arthur Peacock, Rev Ursula Shone and Sir John Polkinghorne were also cited in this article speaking out against equating creation accounts with scientific accounts.

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[30] A transcript of the programme is available online at: http://www.angelfire.com/nb/lt/docs/called19.htm (last checked 27 July 2007).

An article by Cassidy (2002, March 19) reported that after a group of "secular campaigners" including scientists, philosophers and church leaders, called on ministers to ban the teaching of creationism in state-funded schools. The week before teachers from the teaching union NASUWT criticized the Prime Minister's stance on the issue and spoke out against private sponsoring of schools therefore making it possible for groups with "completely objectionable" views to get involved. In the article it was also made clear that the teacher union and the secular campaigners (members of the National Secular Society were quoted later in the article) objected the idea of faith schools and an influence of religion in education in general. *The Daily Telegraph* published an article by the geneticist Steve Jones (2002, March 20) in which he criticized the teaching of creationism and the view of Tony Blair on the issue from the point of view of an evolutionary scientist.

Dean (2002, March 29) reported that 43 scientists and philosophers had signed a petition. It was organised by the British Humanist Association and called for legal requirements in the National Curriculum for Science to be tightened to prevent creation stories being taught as anything other than religious myths. The petition was sent to Tony Blair and copies were also sent to the then Education and Skills Secretary Estelle Morris and other educational authorities. The issue was also reported as a short piece of news in *The Times Higher Education Supplement* (No byline, 2002, March 29). The petition explicitly referred to newspaper and TV coverage of the controversy around Emmanuel College. The exact wording is:

"Creationism in British schools

We are alarmed to learn that creationists are now teaching in at least one state-funded school, Emmanuel College in Gateshead, that the Darwinian evolutionary hypothesis is "a matter of faith" (TES, 25/1/02, Guardian 9/3/02, Channel 4 News 11/3/02). Creationist science teachers appear to be exploiting the wording of KS4 Science in the National Curriculum, which refers to pupils learning "how scientific controversies can arise from different ways of interpreting empirical evidence [for example Darwin's theory of evolution]".

Scientists may disagree about the details and processes of evolution, but they do not disagree about whether it happened, and it is disingenuous of teachers to claim otherwise.

We urgently call for: a tightening up of the legal requirements in National Curriculum Science to prevent creation stories being taught as anything other than religious myths; clear guidance from GCSE examination boards to teachers and pupils that creationism is not a scientific hypothesis; reform of the Science curriculum to enable teaching about Darwinian evolution well before KS4, which may become optional in the future - we suggest teaching it at KS2." (Archard et al., 2002).

This petition aims explicitly at the National Curriculum for Science and argues for a change of the formulation in Key Stage 4 that refers to teaching scientific controversies arising from different ways of interpreting empirical evidence. It was of special concern to the members of the British Humanist Association that the theory of evolution was mentioned in brackets (Chapter 1). This formulation made it possible for the educators at Emmanuel College to bring in alternative explanations in science education and still fulfil the legal requirements of the National Curriculum (see also Allgaier and Holliman, 2006). Woodward (2002, April 1), Garner (2002, April 1) and O'Leary (2002, April 1) reported that Phil Willis, education spokesman of the Liberal Democrats, demanded the day before from the government that the way OFSTED had carried out the inspection of Emmanuel College must be investigated. Willis spoke on a conference of the National Union of Teachers (NUT) in Bournemouth. Woodward (2002, April 1: 2) cites Willis in a news report saying that:

"The current debate around creationism is no longer academic – it goes to the very heart of the government's policy of diversity and its love of private sponsorship." [...]

Mr Willis called for the education secretary, Estelle Morris, to intervene. "We must not stand by and see our children become the fodder for the extreme views of religious fundamentalists or their wealthy backers," he said. "OFSTED has a duty to root out such practices, not ignore or encourage them.""

Furthermore, a NUT delegate was quoted in the article speaking out against sponsorship of state-schools by Christian charities such as the Vardy Foundation, especially in schools where there is a high percentage of ethnic minorities. *The Times Educational Supplement* also published a report (Thornton, 2002, April 12) from the NASUWT conference on 12 April 2002. The teaching union spoke out against faith schools, mainly because of the reports about Emmanuel College and the teaching of creationism. Smith (2003, May 20) reported that the National Union of Teachers, the National Association of Schoolmasters Union of Women Teachers and public workers' union Unison had all expressed concern about the plans for a Vardy-funded academy in Newcastle.

Science editor Robin McKie (2002, April 7) wrote in *The Observer* that "an unprecedented amalgamation of the country's top religious and scientific leaders" had called on Tony Blair to express their "growing anxiety" over the spread of faith schools in Britain, enhancing the credibility to this group of experts through the description added to the quote. The warning of the group that was led by the bishop of Oxford Richard Harries and biologist Richard Dawkins followed the news that Gateshead's Emmanuel College had included creationism in biology lessons.

In a letter to the Prime Minister this heterogeneous group – which includes various religion and scientific experts – expressed concern over the introduction of creationism in British schools. The call for action by this group was also reported in *The Independent* (Cassidy, 2002, April 8) and *The Journal* (No byline, 2002, April 8). *The Times* featured a small piece of news (Coppen, 2002, April 13), that reported that Church of England bishops had written to the Prime Minister to express concern over the teaching of the theory of creationism at a college in Gateshead. Their letter, so the article, was also signed by Richard Dawkins, who had challenged the education practice of the school before. *The Times Educational Supplement* reported the call by the group in an article about British Humanists (Dean, 2002, April 19). The letter's exact wording is:

"We write as a group of scientists and bishops to express our concern about the teaching of science in the Emmanuel City Technology College in Gateshead. Evolution is a scientific theory of great explanatory power, able to account for a wide range of phenomena in a number of disciplines. It can be refined, confirmed and even radically altered by attention to evidence.

It is not, as spokesmen for the college maintain, a "faith position" in the same category as the biblical account of creation which has a different function and purpose.

The issue goes wider than what is currently being taught in one college. There is a growing anxiety about what will be taught and how it will be taught in the new generation of proposed faith schools.

We believe that the curricula in such schools, as well as that of Emmanuel City Technical College, need to be strictly monitored in order that the respective disciplines of science and religious studies are properly respected." (Harries et al., 2002)

This petition that was signed by scientists and bishops addressed different issues. Firstly, it is noteworthy that the atheist Richard Dawkins teamed up with high-profile churchmen. A closer examination of the petition reveals that the explanatory power and the superior epistemic status of the theory of evolution are emphasized in the letter (and no reference to any benefits of faith or religion was made in the letter). Here the letter attacked the statement by Emmanuel College sources that the theory of evolution is a "faith position" in the same category as the creation myths in the Bible. The last section of the petition seems to aim at the new type of schools – Emmanuel City Technology College is explicitly mentioned – more generally and suggests that the teaching content in schools of this type must be monitored more carefully to avoid the blurring of the boundaries between science and religion. The text of the petition therefore indicates that the science curriculum and media reporting are important sites for the boundary-work of science (Gieryn, 1983; 1995; 1999).

Brayshay (2002a) reported that a group of parents was concerned about the involvement of the Vardy Foundation at a school in their area and that they feared religious indoctrination at a school that had not opened at the time of the report. The parents had therefore set up an

action group with its own website[31]. Canovan (2002, November 15) and Jennings (2002, July 22) also informed of a group of parents that was concerned about their children being "brainwashed" and opposed Vardy sponsoring of schools in their region.

Groups and organisations such as the British Humanist Association and the National Secular Society appeared in the coverage several more times writing letters or being quoted attacking the Vardy Foundation and the educators at Emmanuel College for religious "indoctrination" and claiming that they "peddled" creationism (e.g. Mason, 2002, March 27; Blackburn et al., 2003, February 12).

The organisations, groups and individuals mentioned in this section had different reasons, aims and intentions why they got involved in this particular public debate (4.3.). Also the issues that were addressed in the petitions, letters and statements are different ones and ranged from the National Curriculum (Section 4.2.1), to sponsorship in education (Section 4.2.2.) and to a general critique of governmental authorities and policies (Section 4.2.3).

However, following the newspaper coverage about the issues all the experts and groups had in common that they were arguing against the teaching of creationism and opposing the statements of experts of Emmanuel College. Therefore these experts formed one argumentative coalition against Emmanuel College and the Vardy Foundation that was held together by a particular argument (Hajer, 1997).

This "assemblage" (Irwin and Michael, 2003; Deleuze and Guattari, 2004) consisted of diverse elements, issues and experts. It united scientists (e.g. Richard Dawkins, Steve Jones, Peter Atkins), education experts (e.g. various teaching unions and individual teachers), NGOs and campaigners (e.g. the British Humanist Association and the National Secular Society); politicians (e.g. the Lib Dem MPs Jenny Tonge and Phil Willis); religious experts and clergy (e.g. Bishop of Oxford Richard Harries and the other bishops signing the petition) around a single issue. This heterogeneous assemblage was also backed through a variety of letters and comment writers, such as e.g. No byline (2002b, March 9)

[31] The website given in the article was no longer active at the time the research was conducted.

or Carr (2002, March 14; 2002, June 24) arguing against and undermining the expertise of the educators at Emmanuel College and the Vardy Foundation. However, within this coalition that was tied together through the arguments of the experts and their common goal to attack Emmanuel College for various reasons there were several concrete action groups that came together to write petitions to representatives of the government about particular issues of the controversy.

### 4.4.2. Emmanuel College, the Vardy Foundation and their supporters

The educators of Emmanuel College and the Vardy Foundation also formed a coalition with other experts. The article by Branigan (2002, March 9) on the weekend the conference was held at the school linked Emmanuel College to the Newcastle-based Christian Institute. Nigel McQuoid and John Burn, former head of Emmanuel College, were both described as connected to the Vardy Foundation, but Mr Burn is described as one of the founders of the Christian Institute. Reverend David Holloway was described as an influential and strictly traditionalist evangelical Christian and another founder of the wealthy and influential "fundamentalist" Christian Institute. This institute in Newcastle was described as having connections to Conservative peers, e.g. Baroness Cox, who is also one of Emmanuel's directors (Branigan, 2002, March 9). Formally there were no links between the school and the institute, but Branigan wrote that papers on educational issues by senior staff of Emmanuel College had been published on the Institute's website. One of these papers, co-authored by Burn and McQuoid, stressed that both creation and evolution are faith positions. The connection between Emmanuel College and The Christian Institute was also mentioned and repeated in many of the following articles (e.g. Clancy 2002, March 15; 2002, March 22).

A link was also mentioned to Ken Ham, president of the Answers in Genesis International Ministry – the organisation that organised the creationist conference at Emmanuel College – in Branigan's (2002, March 9) article.

It has already been mentioned before (4.4.1.) that the Bishop of Durham, Michael Turnbull, also called for re-inspections of the College (Herbert, 2002, March 15). But he backed calls for a re-inspection that would set the college free from allegations – therefore he must actually be seen as a supporter of the school. Another clergyman, Reverend Richard Harrison based at the Crane St Baptist church in Pontypool (see Section 4.3.6.), was also quoted in an article by Branigan (2002a, April 9), backing the Vardy Foundation and the teaching of creationism alongside the theory of evolution.

Prime Minister Tony Blair, also mentioned before (4.1.1.), defended the school for its very good results and declared newspaper reports about the controversy around Emmanuel College as being exaggerated (e.g. Kallenbach, 2002, March 14). Educational Authorities such as OFSTED and the Department for Education and Skills confirmed that the teaching at Emmanuel College took place within the requirements of the National Curriculum and re-inspection was therefore considered as being not necessary (e.g. Garner, 2002, May 24; No byline, 2002, May 24) after individual experts called for a re-inspection of Emmanuel College (see 4.2.3.).

Moreover, also parents of Emmanuel College students and pupils at Emmanuel College were cited backing the school primarily for its good results (e.g. in No byline, 2002b, March 15; Herbert, 2002, March 15; Smith, 2003, May 20). Emmanuel College also received support from a couple of faith-based organisations and especially from creationist groups, for instance from a representative of the Biblical Creation Society in Rugby (Garner, 2002, April 2) or from Randall Hardy of the British office of Creation Research (in Branigan, 2002, March 25).

Dean (2002, April 26) reported in *The Times Educational Supplement* that a group of 30 scientists and academics had told the then Education Secretary Estelle Morris that

creationism and evolution should be considered side by side in school science lessons. Their letter opposed recent calls by "eminent" scientists and philosophers for changes to the National Curriculum in the wake of the row over creationism in schools. This letter was only reported in *The Times Educational Supplement* and by none of the other newspapers in the sample. The group – which was described as including "specialists" in scientific disciplines at UK universities such as biology, physics, geology and chemistry – challenged the view that only one theory of life's origins, namely evolution, should be taught in schools. They called for "objectivity in the curriculum". Their spokesman Andy McIntosh (2002, March 16) also wrote a letter to *The Daily Telegraph* in which he defended Emmanuel College for its "excellent work" in debating creation and evolution and asked if Richard Dawkins', Peter Atkins', Steve Jones' and others' comments were driven by science or their personal atheism. McIntosh (2002, March 16) wrote in his letter that there is "little hard experimental evidence for the evolutionary hypothesis".

The group signing the petition said it wanted schools to teach children how to think and not what to think. Creationism should not be immediately excluded, neither should evolution. The two needed to be considered carefully and there should be an open-minded discussion in the classroom that examines the evidence.

The letter is available on several homepages[32]. This is the exact wording of the letter:

"The undersigned academics, scientists and educationists are deeply concerned that the reasonable position taken by the QCA in National Curriculum science and by OFSTED concerning the teaching of origins at secondary level has been challenged. (We write as a group of individuals and consequently the views expressed do not necessarily represent the view of those organisations with which we are associated).

The National Curriculum requires that Darwinian evolution is put across as the dominant scientific theory but also requires that pupils are taught "how scientific controversies can result from different ways of interpreting

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[32] e.g. on the BBC website: http://news.bbc.co.uk/1/hi/education/1979840.stm; or on two other websites: http://www.biblicalcreation.org.uk/educational_issues/bcs116.html; http://www.answersingenesis.org/docs2002/0509scientists.asp#_ednref1, whereas a note in on the last site says that this was an ad hoc group, which came together to sign this letter. The letter was not sent by any organization and it is signed by only 27 individuals and not 30 as reported in the *TES* (all internet sources were checked 27 July 2007).

empirical data". Science should be taught with the critical appraisal of alternative theories. Such debate concerning opposing theories provides rigour in scientific method and contributes to the development of critical thinking by pupils.

We find it most inappropriate that some well-meaning scientists have given the impression that there can only be one scientific view concerning origins. By doing so they are going way beyond the limits of empirical science which has to recognise, at the very least, severe limitations concerning origins. No one has proved experimentally the idea that large variations can emerge from simpler life forms in an unbroken ascendancy to man. A large body of scientific evidence in biology, geology and chemistry, as well as the fundamentals of information theory, strongly suggest that evolution is not the best scientific model to fit the data that we observe.

We ask therefore that, where schools so choose, you ensure an open and honest approach to this subject under the National Curriculum, at the same time ensuring that the necessary criteria are maintained to deliver a rigorous education." (McIntosh et al., 2002)

The argument of the last paragraph of the petition is close to the argument of Emmanuel College educators that stresses their openness and open-mindedness and relates to their argument of informed choice (see 4.3.2.a and 4.3.4.b.). The main corpus of the petition is framed in a scientific rhetoric and in line four of the second paragraph the term "scientific method" is explicitly mentioned. The mainly scientific experts signing the letter were opposing a change of the controversial paragraph of the National Curriculum for Science at Key Stage 4 about scientific controversies, so that "alternative theories" could still be brought in in science classes alongside the theory of evolution. This petition is also addressing the boundaries of science and it indirectly backed the teaching practice at Emmanuel College. Maintaining the status quo would help them doing so also in the future and still be within the requirements of the National Curriculum. Having a look back at the conference held at Emmanuel College one finds that the spokesman of the group, Andy

McIntosh, was also one of the speakers at the creationist conference organised by Answers in Genesis[33].

This assemblage defended and supported Emmanuel College. It also had diverse concerns, intentions and issues and addressed the National Curriculum for Science (4.2.1.), sponsorship of state education (4.2.2) and the favourable report by OFSTED (4.2.3.). Similar to the opposing assemblage attacking Emmanuel College it consisted of various elements and experts, e.g. scientific experts (Andy McIntosh and the other signatories of the petition); education experts (Emmanuel College sources); NGOs and campaigners (The Vardy Foundation, The Christian Institute, diverse creationist organisations); politicians and authorities (PM Tony Blair; OFSTED and the Department for Education and Skills); religious experts and clergy (Bishop Michael Turnbull; Reverend Richard Harrison); and parents of pupils at Emmanuel College and pupils at Emmanuel College themselves. This assemblage also received support through a range of letter writers and through commentators in the press (e.g. No byline, 2002a, March 15; Phillips 2002, March 15; Utley, 2002, March 16). Within this coalition there was also one concrete action group that came together to write to representatives of the government to address a particular issue of the debate.

### 4.4.3. Organisations and individuals arguing that faith and science do not oppose each other

In addition to the two main assemblages either backing or attacking Emmanuel College and its teaching practice a smaller third argumentative assemblage could be identified in the press coverage in the sample. These actors could be called reconciliatory groups since they did not necessarily see religion and science in conflict. However, they did not receive much press coverage.

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[33] The announcement of the "Newcastle Day Conference at Emmanuel College, Gateshead" and a list of speakers can be found in the newsletter Answers Prayer News, Jan.-Mar. 2002. p. 8, available online at: http://www.answersingenesis.org/uk/newsletters/uk-january2002.pdf (last checked 27 July 2007).

On 27 March 2002 a letter by the organisation Christians in Science was published in *The Independent* that clarified that the members of this organisation saw no necessary conflict between the theory of evolution and their Christian belief (Burke et al., 2002, March 27). It was signed by eight members of Christians in Science, who were scientists and other academics at UK universities.

A letter by Richard Wilkins (2002, March 28), writing on behalf of the organisation Association of Christian Teachers, was published in *The Independent.* Wilkins stated that members of his organisation see no necessary contradiction between Biblical explanation of how the world came into being and the theory of evolution. Here the letter writers also pointed to the members of the organisation Christians in Science, stressing that there are professional scientific experts of Christian belief that are acknowledged in the scientific community and do recognized, valid and reliable scientific work.

The organisation Christians in Science also wrote a letter to the Prime Minster which is dated 15 May 2002. In it they were distinguishing their own position from a young-Earth creationist perspective (Chapter 1). Members of Christians in Science accepted the version about the origin of mankind and Earth that science has to offer and did not see science and religion in conflict. In the letter they stressed that the science specialists now would have a responsibility to deal with the "spiritual dimension" in science education (in the letter they backed this claim with empirical research results) and there would clearly be a need for science teachers with experience in teaching science and religion. 21 academics from three academic fields – science, religious education and science education – signed the letter[34].

This call was not reported in the coverage of the newspaper in the sample. Also an extended internet search did not find any trace of feedback or reports about the call by Christians in Science to the Prime Minister. The view that religion and science do not contradict each other and are not necessarily in conflict was also expressed in a few

[34] The whole letter is available on the Christians in science website http://www.cis.org.uk/resources/articles/article_archive/schools_evolution.htm (last checked 27 July 2007), where it says that not all of the co-signatories are members of Christians in Science (CiS) and that it should not be taken as representing the view of all CiS members.

articles, primarily by religious experts and clergy (e.g. in Purvis, 2002, March 24), by a small minority of scientists (e.g. in No byline, 2002c, March 15); by a few letter writers and also in a few comments (e.g. Vallely, 2002, March 15).

## *4.5. Conclusions*

The results of the quantitative media analysis show that the debate about whether creationist and/or evolutionary accounts of the origin of life should be taught in science classes generated reporting in the UK press throughout 2002 to 2004 (see Figure 4.1.). Most of the articles concerning the controversy around Emmanuel College were published between 9 March 2002 – the weekend a creationist conference was held at the school – and 24 March 2002 when it was reported that OFSTED is not going to re-inspect the college (4.1.2.). This is not inconsistent with previous reporting of science-based controversies where reporting generally follows key events (e.g. Bucchi 1998; Holliman, 2000; 2004; Cassidy, 2005). It is argued that the press release by OFSTED, which said that the education inspectorate is satisfied with the science teaching at Emmanuel College fulfilling the requirements of the National Curriculum, led to a preliminary closure of the media debate around the school (4.2.3.). However, Emmanuel College continued to generate a small amount of ongoing news coverage as the school that taught creationism after the OFSTED announcement was made (see Figure 4.1.).

The quantitative analysis also showed that the debate around Emmanuel College was mainly an issue for the national elite press; less so for the regional/local press with their circulation area around the school; also for newspapers specialising in education coverage. This suggests that different newsrooms judged the news values of the debate in different ways. The distribution of articles along types of newspapers also confirmed the findings of a previous study (Ellegård, 1990) (4.1.3.).

More than a third of the articles written on the debate were news reports, but also a significant amount of letters by experts and citizens were published during the debate (see Figure 4.2.). 21 percent of the articles were opinion articles this reflects an ongoing trend in relation to the balance between news reports and comments (e.g. Steele et al. 1996; Rosen, 2001; Weaver, 2001; Schudson, 2003; Bolz, 2006) (4.1.4.).

The qualitative examination of the controversy around Emmanuel College (4.2.) showed that the public debate around the school was not based on a single controversial issue. Controversial issues were the nature of science, the teaching of creationism and the theory of evolution and the specific requirements of the National Curriculum for Science (4.2.1.); the new school type of City Technology Colleges and the issue of private sponsorship and influence in education (4.2.2.); very good school results and an excellent report written by an OFSTED inspection team (4.2.3.); and a few other (more marginal) issues (4.2.4.) can be seen as one reason why the story of Emmanuel College kept its news value for more than just a few days. The finding that the debate consisted of various controversial issues follows the results of other studies that identified several dimensions in public debates about science and technology (e.g. Peters, 1994; 1996; Holliman, 2000; 2004).

There are also connections between the expert sources that were selected to appear in the coverage and the different controversial issues of the debate around the school. The quoted experts had an influence on the definition of the different issues of the controversy and the descriptions of the quoted experts could have an influence on which definitions have to be seen as being more legitimate and credible.

In the debate around Emmanuel College a range of different experts including scientific experts; education experts; NGOs and action groups; politicians, officials and authorities; religious experts; parents and pupils; and media professionals were quoted directly in the coverage of the sample (4.3.1). This is similar to previous studies that found that varieties of different types of experts were involved and represented in the media in other complex science-based controversies (e.g. Coleman, 1997; Bucchi, 1998; Miller and Beharrell,

1998; Hargreaves et al., 2003; Holliman, 2000; 2004; Ten Eyck, 2005; Boyce, 2006). However, the distribution of expert sources does not allow making any informed statements about which issues the experts were addressing and what they were saying about the debate. Therefore a further qualitative investigation was conducted that found that within the different categories of experts ranges of arguments about the different controversial issues were identified. In this sense the results suggest that by knowing the types of experts that speak out in a controversy it cannot be inferred what issues they are going to address and which arguments the experts will bring forward. In this sense only a combination of qualitative and quantitative analyses can address both of these issues.

Among the education experts the educators from Emmanuel College defended the teaching of creationism drawing on an argument of informed choice but they also used other arguments (4.3.2.a). Education experts from teaching unions primarily criticized sponsoring of state education (4.3.2.b). Various individual education experts were addressing several other aspects of the debate with various arguments (4.3.2.c).

The scientific experts addressed the nature and boundaries of science and the majority of scientific experts argued that creationism is not science and should therefore not be taught in science education (4.3.3.a). However, very few scientific experts were found attacking the epistemological superiority of the theory of evolution (4.3.3.b). Another small group of scientific experts argued that scientific and religious accounts do not contradict each other and that this could also be taught in schools (4.3.3.c).

All quoted scientific expert sources used a similar rhetoric and type of argument that was related to empirical testing and validation of facts, or what could be dubbed the scientific method. This finding is similar to previous studies that examined communications of scientists and identified the use of a particular scientific discourse that is different from the discourses of other experts (e.g. Gilbert and Mulkay, 2003; Cook et al., 2004; Burchell, 2007). For instance, Gilbert and Mulkay (2003) describe scientists as drawing on a specific empiricist language repertoire and Burchell (2007) concludes that scientists describe

themselves as "empiricist" whereas they describe non-scientific experts as "contingent others". This use of language can also be interpreted as discursive boundary-work (Gieryn, 1983; 1995; 1999) that serves the purpose of questioning the legitimacy and credibility of non-scientific experts in debates about science.

One possible reason for the use of a common scientific discourse could be found in the enculturation of the scientists through the school and university system in a professional community (e.g. Ziman, 1978; Delamont and Atkinson, 2001; Roth and Bowen, 2001; Campell, 2003; Kaiser, 2005). Here, it is necessary to learn how to talk, argue and write in scientific terms according to the norms of the scientific community in order to achieve a degree in a scientific subject and to be taken seriously in the scientific expert community. In this sense science education creates and maintains the boundaries of science and contributes to a (re)construction of scientific meaning over time.

The scientific experts quoted in the sample were the ones that spoke with authority about what counted as science and what did not and also what should be taught in science education. The science curriculum was therefore one of the key sites of scientific boundary work that re-confirmed the scientific status of particular facts, theories and hypotheses.

Generally, science in the media is another key site for the definitions of the boundaries of science (e.g. Nelkin, 1995). Representations of science education in the media address several levels of scientific boundary work. Scientific experts represented in the media speak about the nature of science and about what is scientific and what is not. Another level addresses how the nature of science can and should be represented in the science curriculum and what precisely has to be taught so that pupils can learn how to make the distinction between science and non-science. This is a contested terrain and also at the heart of the controversy around teaching creationism. A further level addresses which approaches of science education are represented in the media and which experts are selected speaking with authority about science education. It follows that a particular representation of science education in the media carries an implicit notion of a particular

understanding of the nature of science that is represented with and in the representation of science education.

The majority of scientific experts quoted in the sample depicted the practices of science as processes that lead to objective scientific facts. Consequently, they recommended teaching science as set of facts free of the social and communicative activities of the scientists. However, it is at least theoretically possible that the representation of academic science education experts would have led to the representation of different images of science and what should be taught about it. The discussion of teaching controversy in the literature review (Chapter 2, Section 2.2.2.) showed that many science education experts see the value of teaching (the nature of) controversy and socio-scientific issues in order to get a better understanding of how science works in practice (e.g. Reiss, 1993; Jenkins, 1997; 1999; Millar, 1997; Ratcliffe and Grace, 2003; Oulton et al., 2004).

The representation of a particular approach of science education in the media leads to the representation of a particular understanding of the nature of science. It is possible that the version of science that scientific experts want to see taught in science education in schools differs from the version that academic science education experts recommend to teach in science in schools. However, in the UK context no science education experts were quoted in the sample and it was primarily the scientific experts that were selected by the journalists as authoritative spokespeople about science and also about what should be taught in science in schools.

Among the experts of NGOs and action groups also several issues were addressed and various arguments were found. Secular and humanist campaigners as well as an action group of parents criticized private sector involvement in state education and feared religious "indoctrination" and "brainwashing" through wealthy sponsors (4.3.4.a). Sir Peter Vardy and representatives of the Vardy Foundation pointed to the school's good results, defended sponsorship involvement in education and used an informed choice argument to defend the teaching of creationism (4.3.4.b.). Representatives of creationist organisations

addressed moral implications of the theory of evolution and depicted it as an atheist dogma and materialist worldview (4.3.4.c.).

Various arguments were found among the political experts and spokespeople of authorities. Tony Blair defended the school for its good results but Jenny Tonge and Phil Wills attacked the school for teaching creationism (as reported in the press) and demanded that the way OFSTED carried out the inspections must be investigated (4.3.5). There were also various arguments in the category of the religious experts why Emmanuel College should be re-inspected or if creationism should be taught in science education (4.3.6.). Pupils and parents of pupils at Emmanuel College backed the school for its success in education and the good results it achieved (4.3.7.).

Descriptions of experts could depict them neutrally by their name, profession, role or function but they could also further qualify and enhance their credibility, for instance by describing them as "leading" experts in their fields. This was mainly the case with descriptions of scientific experts (4.3.3.a) and individual education experts (4.3.2.c) arguing for (the teaching of) the theory of evolution and against (the teaching of) creationism and scientific experts (4.3.3.c) that did not challenge the theory of evolution but saw science compatible with faith.

However, the way experts and expert quotes were presented could also challenge the perceived credibility of the experts. This was the case with two scientific experts challenging the epistemic status of the theory of evolution (4.3.3.b.), but also Emmanuel College sources (4.3.2.a.), Vardy and the Vardy Foundation (4.3.4.b.) and representatives of creationist organisations (4.3.4.c) were described or framed in ways that could potentially challenge their credibility.

Ways of challenging the credibility of experts were by describing them as receiving funding from a creationist organisation (4.3.3.b), selecting certain quotes that did not match their argument (4.3.3.b) or by countering their quote with opposing accounts of a multitude of credible experts (4.3.4.c). In this regard the journalists used the words of some

expert sources also to discredit them. In this way they can protect themselves from libel suits and do not conflict with media law (e.g. Tuchman, 1972). Ways of framing expert sources or their quotes in a light that could challenge their credibility therefore have to be more subtle than the ways of enhancing the credibility of expert sources. The next chapter is going to investigate the issue of balancing quotes by expert sources in more detail (5.2.7.)

These results leave the overall impression that experts contesting the epistemological status of the theory of evolution or were arguing for the teaching of creationist ideas in science classes were slightly more likely to be described, framed or represented in ways that could challenge their credibility. None of the experts arguing for evolution had a description that could challenge their credibility. However, here it must be noted that there was a methodological difficulty of determining which descriptions could potentially challenge the credibility of the quoted expert. The interpretation of the description of the experts depends on the views of the individual readers and it is possible that various readers will interpret potentially challenging descriptions in different ways. Descriptions that enhanced the credibility of quoted experts were in this regard clearer and easier to identify and determine.

The expert sources represented in the newspapers were not only passive commentators on the controversy but some of them also formed action groups in order to attempt to influence decision-making processes about some of the issues arising from the coverage about the controversy. Two different kinds of coalitions between experts could be found (4.4.). The first type of alliance is one of language and common arguments and goals. The second type of coalition is more concrete and tied together by common actions, for instance by writing a letter to a representative of the government or another palpable call for action.

Both types of coalitions illustrated that within the different categories of experts there were various views on the controversial issues of the debate and experts who wanted to publicly

engage with issues of the controversy formed collaborative networks of expertise with experts from other expert fields in order to enhance their overall credibility, visibility and weight of argument. The action groups that came together in the course of the controversy were hereby of particular interest. Most of the petitions were reported in the newspapers, but additional online searches were needed to access and find the actual texts and names of the signatories. Action groups displayed the consensus on an issue among the signatories. This consensus can be particularly credible and effective if experts from different categories of experts agree on a position concerning a controversial issue, for instance, when scientific and religious experts together sign a petition saying that the Biblical account on creation is a "faith position" and that the theory of evolution is not. Moreover, it is also possible that the combination of different sets of experts and their credibility was also a strategy to get access to the media. The petitions did not receive equal coverage. Petitions against Emmanuel College and the teaching of creationism in science classes received most coverage and also had descriptions that enhanced the credibility and expert status of the signatories. A petition arguing for the status quo in the science curriculum that effectively backed the teaching practice at Emmanuel College was reported in one specialist newspaper. The description of these signatories also stressed the professional and specialist status of the experts. A letter that argued for a reconciliatory approach between religion and science in science education was signed by a heterogeneous group of experts but did not receive any coverage at all.

A look at the groups and connections between quoted experts that emerged in the coverage indicated that the debate around Emmanuel College was primarily framed as a conflict story, with two camps either supporting Emmanuel College and the Vardy Foundation, or attacking it, for various reasons. The emergence of a small group of experts that advocated a reconciliatory position shows that an alternative framing of the story would have been partly thinkable – but this group remained at the margins of the controversy as represented in media reports and did not receive a lot of attention in the press coverage, e.g. a letter to

the Prime Minister received no coverage in the sample at all (this will further be investigated in Chapter 5).

Irwin and Michael's (2003) notion of "ethno-epistemic assemblages" – a heuristic tool set up to conceptualize the complex interweavings in science-society relationships, e.g. concerning the distinction between lay and expert actors in controversies with socio-scientific content (see Chapter 2, Section 2.1.1.) is helpful to conceptualise the groups and coalitions that form in the debate around Emmanuel College. The assemblages that appeared in the press coverage do cut across expert categories and contain, e.g. scientific, educational and religious experts, politicians, NGOs and action-groups, as well as parents and/or pupils. They employed different truth claims and world views (e.g. scientific arguments, political arguments, moral/ethical arguments etc. – the "epistemic" dimension) and contained different types of situated and local knowledge (from distanced observing and commenting academic and other experts, even from other countries, to local parents and pupils that are directly affected by the results of the debate – the "ethno" dimension).

The results also mean that in this controversy it was not the case that a certain group of experts of one category faces a group of experts from another category (as for instance scientific experts versus religious experts). Instead coalitions that entail different forms of expertise and knowledge formed to pursuit common goals and faced other heterogeneous coalitions with opposing aims. These coalitions seem to blur the boundaries between different types of expertise and often also between lay and expert knowledge in their common "struggle for credibility" (Epstein, 1996), visibility and legitimacy. In practice one seems to encounter collective forms of expertise instead of or alongside struggles of single expert actors. Groups with comparatively little expert credibility are theoretically able to develop further credibility in controversy context through the use of credibility tactics (Epstein, 1995). (Online) networking with other experts can be a successful strategy to enhance credibility (Limoges, 1993).

However, the findings of this study also point to the methodological difficulty of systematically investigating assemblages of experts and also of differentiating expertise, since many of the experts were members of various social groups and it is not always clear whether their statements were based on their specialism, experience and expertise, personal opinion or a particular world view and cultural values they personally promoted.

Content analysis alone cannot answer questions about why expert sources were selected, how these selection processes took place and why some expert sources were seen (and described) as being more credible than others. The next chapter is therefore going to investigate the production side of this debate in the UK press. It presents results of interviews with journalists and special correspondents on how journalistic practice might have influenced the representation of expertise in this debate in the British press.

# 5. News production in the controversy about teaching creationism and the theory of evolution

This chapter serves to investigate the processes of news production in the controversy about teaching creationism and the theory of evolution in science classrooms. Examining media production processes helps to gain a better understanding of why the newspaper coverage about the controversy took the form it did in this story about science education. The analysis in this chapter examines interview data with seven journalists and specialist correspondents (for further details of the data collection and analysis see Chapter 3, Section 3.3.). It also has a look at what kinds of journalists and specialist correspondents reported the debate around Emmanuel College in the sample, this is based on an analysis of media content (see Chapter 3, Section 3.2.4.b.).

The results are situated within existing studies of media production, in particular of science in the news, extending this knowledge base by investigating science education in the news. This study starts from the methodological premise that media content and media production should be seen in relation to each other (Thompson, 1995). The analysis of media production presented in this chapter therefore refers back to and is informed by the findings in the previous chapter.

This chapter aims at finding out if the specialism of correspondents had an influence on the newsworthiness the media professionals ascribed to the story (5.2.2.). It also investigates which issues the media professionals considered being the issues of the debate (5.2.3.), the expert sources they selected (5.2.4. and 5.2.5.) and what role the professional practice of media professionals played in shaping the reporting of the controversy around teaching creationism and the theory of evolution (5.2.6 and 5.2.7.). It is argued that these factors could have an influence on the newspaper articles constructed by the media professionals.

A final section (5.3) examines whether promotional strategies played a role in newspaper reporting of the controversy.

## *5.1. Journalists and specialist correspondents*

The controversy around Emmanuel College teaching creationism in science classes was reported by a range of specialist correspondents. Table 5.1. shows the distribution of specialist correspondents according to bylines of the publications they were writing for in the news reports of the sample (for the data collection see Chapter 4, Section 3.2.4.b.). Of course, news reports were only a fraction of the articles published in the sample (287 articles in total – see Chapter 4, Figure 4.2.). Other articles than the news reports (comments; letters; book reviews and other articles) did not have bylines that indicated the specialism of the authors, therefore the analysis presented here focused only on news reports.

**Table 5.1.: The table shows the specialism of the correspondents according to byline**

| | |
|---|---|
| Education Correspondents or Editors | 33 (29.7 %) |
| Science Correspondents or Editors | 12 (10.8 %) |
| Foreign Correspondents | 6 (5.4 %) |
| Religion Correspondents | 2 (1.8 %) |
| North of England Correspondent | 1 (0.9 %) |
| Correspondent for Parliamentary Affairs | 1 (0.9 %) |
| *News reports written by specialist correspondents* | *55 (49.5 %)* |
| News reports with no byline | 56 (50.4 %) |
| *News reports in total* | *111 (100%)* |

Table 5.1. shows that almost half (55 articles – 49. 5 %) of the 111 news reports in the sample were written by specialist correspondents. Of these education correspondents and editors were the group of specialised correspondents that wrote most (33 reports – 29.7 %)

of the news reports about the controversy. This number was significantly affected by the inclusion of two specialist publications on education, since authors writing for these publication were counted as journalists specialised in education news (see Chapter 3, Section 3.2.4.b. for data collection procedures). 22 of the articles (19.8 %) by education correspondents were published in the *Times Educational Supplement* and 5 (4.5 %) of the articles written by education correspondents were published in the *Times Higher Education Supplement* in the sample. The controversy was reported in six articles (5.4 %) written by educational correspondents in the remaining newspapers. The two weekly publications specialised in education played a role in reporting the controversy with an emphasis on the educational and political controversies involved in the debate around Emmanuel College (see Chapter 4, Section 4.2.).

The selection of the education newspapers had an effect on the structure of the sample as a whole. Specialism in education is higher than otherwise would be the case through the inclusion of the two newspapers specialised in education coverage. *The Times Educational Supplement* was also the first newspaper that mentioned Emmanuel College in connection with teaching creationism when it reported that a creationist conference was going to be held at the school (see Chapter 4, Section 4.1.). However, no manifest evidence could be found in the coverage or in the interviews with media professionals that these newspapers were used as sources in the other newspapers included in the sample.

The group of correspondents, reporters and editors that specialised in science wrote 12 news reports (10.8 %). The group of reporters covering foreign news wrote six articles (5.4 %). This group contains all the foreign correspondents reporting the debate about teaching creationism and the theory of evolution mainly in the USA but also in other countries. One news report (0.9 %) was written by the North of England correspondent (Herbert, 2002, March 15) of *The Independent.*

Although the debate around teaching creationism had a strong religious component as well, only two news (2.2 %) reports had bylines saying that they were written by religious affairs correspondents. One news report (0.9 %) that reported PM Tony Blair's defence of Emmanuel College in Parliament was written by a designated correspondent for parliamentary affairs (Kallenbach, 2002, March 14) of *The Daily Telegraph.*

33 of the authors (29.7 %) that reported the controversy in news reports were not described in a byline and many of the mainly shorter reports (23 news reports – 20.7 %) did not have authors named at all. In 2002 the regional/local newspaper *The Journal* did not include the name of authors in news reports at all. Therefore eight of their news reports about the controversy were classified in this category.

Overall, the small numbers provide inconclusive evidence and no obvious patterns emerged in the distribution of specialisms. However, the analysis of bylines was useful for finding and selecting news reports that were written by specialist correspondents and also informed the recruitment process of interviewees (Chapter 3, Section 3.2.4.b.). The following sections focus on the interviews with media professionals for further insight into newspaper production processes.

## *5.2. Journalistic practice*

There is a professional community of practice in journalism (e.g. Ryfe, 2006). However, these practices are not necessarily static between newsrooms, or across different desks (e.g. Holliman, 2007). Furthermore, editors for different types of newspapers (e.g. popular versus elite) have different priorities which influences their news selection practices (e.g. McNair, 1999; Richardson, 2007). All hardcopy newspaper journalism is influenced by limited space and time-pressure under which articles often have to be written (e.g. Goodell, 1987; 1989; Weingart, 1998; Nelkin, 1998; Attfield and Dowell, 2003; Schudson, 2003). Also the motivation to pass the various editors and sub-editors is another factor in the

production of newspapers that has an influence on the work of news reporters and specialist correspondents (e.g. Nelkin, 1995; Clayman and Reisner, 1998; Schudson, 2000).

The next sections examine how the interviewees describe their professional practices in their own words and how they selected and presented expert sources in newspaper stories about the controversy around teaching creationism in science classes.

### 5.2.1. Self-perception, training and enculturation of specialist correspondents

In the next sections the results of the interview study will be compared with literature on the professional practice of specialist science correspondents and reporters. Here it is of interest if there are differences and similarities in the professional practice and how these differences can affect the representations and selection of experts in this story about science education.

The specialist correspondents interviewed in this study generally agreed that they are journalists first and specialists second. For instance, here is the statement of one educational correspondent after being asked what a good basis for being a specialised education correspondent is:

> "Well, the same as any other good journalist really, the ability to check facts, to be fair and to be accurate. I wouldn't suggest that you're any different."
> (Educational correspondent, 1 February 2006)

This finding is similar to the results of study on the practices of science journalists. Hansen (1994) concludes in his interview study with science correspondents that journalists specialised in the coverage of science see themselves as journalists first and as correspondents specialised in a certain area second (see also Holliman, 2000).

However, this education correspondent went on emphasizing the strengths of specialised journalism:

"I do believe strongly in specialist journalism and I think therefore people who spend time looking at a particular area, whether it's health or education, will generally do a better job than people who are general reporters or who are trying to cover too wide a range of specialists."

(Educational correspondent, 1 February 2006)

This and other education correspondents stated that it is not necessary for education correspondents to have a long (professional) background in teaching or any other educational professions. Issues like education (or the environment or health in that respect) are also political issues and the correspondent stated that one might find that sympathies might be too strong in one way or another if correspondents had been personally involved in an active role for too long. This statement points to the perceived need for journalists and specialist correspondents to be detached and distanced to be able to report issues in an impartial and objective way. This is an appeal to the professional ideology of journalists that infers the objectivity and impartiality of the correspondents (e.g. Tuchman, 1972; Allan, 2000; Lichtenberg, 2000; Louw, 2001; McNair, 2004; Starkey, 2006). In this respect they argue that by distancing themselves from the expert sources they quote correspondents can represent reality in a balanced and neutral way (e.g. Richardson, 2007). The interviewed educational correspondents also stressed that specialist correspondents must develop enough expertise in their subject area to be able to communicate with and understand the experts in the field but also need the skills of being able to explain expert statements to non-expert audiences. Hence, some background knowledge of the area of specialism is required. Specialist correspondents therefore act as mediators between experts and non-specialists. Implicitly this also means that the specialist correspondent has to know which are the right people to talk to in the subject area. In their words, being

successful in this process required professional experience and communication expertise, as well as detachment and distance since many of the specialists' subjects areas, be it health, education, or science may also be controversial.

All of the interviewed media professionals stated that the knowledge and experience about how these goals are achieved are primarily learned on the job, through their working practice as journalists. This corresponds with the literature on media production that also stresses the enculturation of journalists through their professional colleagues and the professional work experience that is gained while working as a journalist (e.g. Tuchman, 1972; Halloran, 1998; Louw 2001; McNair, 2004; Ryfe, 2006; Schultz, 2000).

However, four of the educational correspondents also stressed specialist journalist training courses that they took before or while working as journalists. The science editor has a science degree, the educational correspondents have degrees in English or in subjects of the humanities. Talking about the process of becoming a specialist correspondent two educational correspondents stated that they have started as general news reporters (one for a regional newspaper) and gradually specialised in the coverage of education (one in education and politics).

From the evidence gathered for this study there seems to be an agreement amongst the specialist correspondents that becoming a specialist correspondent has to do with the experience that is gained working as a journalist and be concerned with the subject area over a longer time. This experience also involves the knowledge about and contacts with the relevant experts.

### 5.2.2. News values and the controversy around teaching evolution/creationism

Every day many potentially newsworthy events take place nationally and internationally.

Any one could be covered by the news media. But not all of these events are reported in

newspapers. Journalists and editors therefore have to select some events to focus on and have to leave out many others. To understand the process of news selection better, various communication scholars investigated news values and newsworthiness (e.g. Allan, 2000; Palmer, 2002; McQuail, 2003; McNair, 2004; Schultz, 2007). Here it is assumed that journalists, specialist correspondents and editors grant some events more value than others and these events therefore have more potential to be represented in the news media. Various authors note that editors, journalists and correspondents assume that the selected events are more likely to attract the interest of their audience(s) than others, often without actually having a clear picture of their readership and audience(s) (e.g. Thompson, 1995; Allan, 2000; Schudson, 2000; 2003). Media professionals such as reporters, specialist correspondents and particularly the editors must therefore come to an agreement on what is news and what is not (Gans, 1979). The selection processes by which journalists, correspondents and editors choose what distinguishes which events are sufficiently newsworthy are influenced by intuition developed through professional practice that journalists and other media professionals acquired while being enculturated into the professional culture of journalism (e.g. Halloran, 1998; Schudson, 2000; McNair, 2004; Schultz, 2007). It is also often mentioned in the literature that journalists follow the work of other (selected) journalists and media professionals in determining the news value of events (Baker, 1994; Luhmann, 2000; Ryfe, 2006; Holliman, 2000; 2004). Tuchman (1972) asserts that the knowledge about what constitutes news is one of the special qualities of media professionals:

> "[...] news judgment is the sacred knowledge, the secret ability of the newsman which differentiates him from other people." (Tuchman, 1972: 672)

In the history of communication research many attempts have been made to compile lists of news values and criteria that can be used to explain why some events have been selected and others have not (e.g. see Galtung and Ruge, 1965; Gregory and Miller, 1998; Harcup

and O'Neil, 2001; Allen, 2000; Palmer, 2002; McNair, 2004). However, Nicholas and Price warn:

"It is important to treat such lists [of news values] with caution. Galtung and Ruge produced their findings after studying the foreign news sections of Norwegian newspapers. There will be variations from country to country (...), and between different types of newspapers (for example, local and national). There may even be different values in different departments within the same news organisation."
(Nicholas and Price, 1998: 93)

One could add that news values might even change from desk to desk and on a day-to-day basis dependent on other events and also on which individual media professionals are in the newsroom at the time the decision is made (Holliman, 2000; 2007; Schultz, 2007). However, these various lists of news values have some points in common, for instance news seems to have something to do with timeliness and the locality of events (e.g. McQuail, 2003). Generally, events that are controversial or involve an element of controversy seem to be more newsworthy than others that are less controversial (e.g. Glasgow University Media Group, 1976; 1980; McQuail, 2003; Schudson, 2003; McNair, 2004). Also the literature on science journalism and science in the media stresses the news value that controversy in science news receives (Goodell, 1987; 1989; Hansen, 1994; Nelkin, 1995). For instance, Miller (1999) holds:

"News value across the media do tend to attach a high importance to controversy, division and secrecy."
(Miller, 1999: 218)

This is particularly relevant for the coverage of the story about teaching creationism and theory of evolution. The analysis of published newspaper articles showed that the story around Emmanuel College contained various controversial issues (Chapter 4, Section 4.2.). The story around Emmanuel College was not one controversy but actually consisted of various contentious elements such as controversial science-based and educational issues,

but it also related to general debates about the status of religion, moral and values, as well as further political issues (Chapter 4; Section 4.3). However, the story was also new and affected children. Therefore it is likely that controversy, conflict and debate were central in the assessment of the news value of the story around Emmanuel College. For instance, one of the educational correspondents answered the following way after being asked whether the debate around Emmanuel College was a debate about science teaching, sponsorship issues, the OFSTED report, multicultural education or about something else:

> "It touches on everything, from cynicism among far left teachers about private companies getting involved, and them having a sinister agenda, kind of paranoia that the government is trying to get in religion by the back door, after all the stories about Blair praying with Bush. It covers all those areas."
> (Educational correspondent, 14 October 2005)

This statement illustrates that multiple controversies were involved in the story about Emmanuel College and also that various experts, such as teachers, private sponsors and high-profile politicians were relevant and conflicting in the story.

Furthermore, all the journalists, writers and correspondents that were interviewed in this study were asked about their view on the news values in the controversy around teaching creationism and the theory of evolution. Consequently, all of the interviewees referred to some of the controversial elements in the story around Emmanuel College.

For instance, two of them, the freelancer and the science editor, related the controversy around Emmanuel College to a more general discussion around religious fundamentalism and the fact that controversy and conflict were involved and had already been reported before. Therefore reports about Emmanuel College could be connected to prior reports about religious fundamentalism. The analysis of the newspaper articles showed that religious fundamentalism was a small issue in the coverage (e.g. Branigan, 2002a, April 9; Pilmer, 2002, March 29; Smithers, 2002, March 28) and that some writers also related the

controversy to religious violence and terrorism (e.g. May, 2002, May 19). This is the statement by the freelancer:

"This was six months after 9/11 and there was considerable anxiety about Islam in particular, and a perception by the British public that Muslim fundamentalism had been steadily taking root in Britain, under our noses and unchecked by the authorities. This disquiet set the scene, while the specific case of Emmanuel City Technology College and its dismissal of Darwinism as 'fascist' gave us a news peg for exploring the issues of faith, dogma and indoctrination in UK schools. [...] It was the background disquiet about religious fundamentalism in Britain, plus the controversy of Emmanuel City Technology College and its single-minded Christian stance on creation and evolution: its prospectus, stating unambiguously that "The Universe was created from nothing by God", had caused a storm among scientists and educationists, resulting in front-page news stories and considerable coverage on TV and radio."
(Freelance writer, 20 April 2006)

This statement by the freelancer indicates that the issue had been covered as conflict between fundamentalists and liberals before (also in other media outlets such as TV and radio) and that this interviewee could follow up on this way of approaching the story. This dramatic way of putting it gave the writer an entry point to the debate (in fact, the article written by the freelancer in the sample starts with McQuoid denouncing Darwinism as "fascist") that the freelancer calls a "news peg". This expression points to newsworthy aspects or angle of the debate from which the article was approached. This way of approaching the story necessarily led to the portrayal of the debate as a conflict between two parties, religious fundamentalist educators and liberal scientists. In this instance the news peg of fundamentalism was used to introduce the story to the reader and gave the writer the opportunity of exploring the news value of controversy and conflict in the story. However, in the article the freelancer went on to interview educators in English Muslim and Jewish schools on their view on teaching creation and the theory of evolution. The article concluded that compared to the views of the interviewed Muslim and Jewish educators the view presented by McQuoid and presented in Emmanuel's school prospectus

"does begin to look like a dogma". Thereby the article written by the freelancer challenged the idea that extremist views on faith and religion are found (only) in Muslim or Jewish faith schools.

Another reason for the story being newsworthy was the sensitization to the issue through previous reports about creationism in the US context. Especially the foreign correspondent and the science editor, but also two of the educational correspondents, stressed that the story was well established in the USA but not as a UK-based story. Moreover, Emmanuel College being the first City Technology College to introduce creationist accounts alongside the theory of evolution had the news value that the school was the first that adopted this contested approach in this particular context.

The topic of creationism being taught alongside or instead of the theory of evolution in science classes was a story that was already familiar from the US context. However, the new story was not about precisely the same controversy as in the US. In the UK context the story could be linked to further previously reported issues that were also controversial, such as for instance the new school types and the sponsorship issue (see Chapter 4, Section 4.2.). That the issue of religious explanations of the emergence of life now allegedly appeared in science classes in a school in Britain therefore had news value for two of the educational correspondents since the controversy about teaching creationism and the theory of evolution in science classes was already familiar from the US context. The science editor affirmed that what happens in the USA was also of special interest in the UK, especially if these events affect or concern the context of the home nation. Galtung and Ruge (1965) call this the news value of "reference to elite nations" (see also Harcup and O'Neil, 2001; McQuail, 2003):

"[...] the British press look at America and think this place [the USA] is a madhouse. And as soon as they see the madness arriving on their own shores it's a great story; there were no problems about that. Anything about creationism in this country and if you find it being taught... "

(Science editor, 13 October 2005)

The science editor's statement also implicitly indicates that the topic of the story is out of the ordinary, unusual and that it was rather unexpected to report such events taking place in the UK context. This news value was also stressed by three of the educational correspondents. For them it was especially the unexpectedness of the story in the UK context, as this educational correspondent stated after being asked about the newsworthiness of the story:

"Simply because it was something that is seen as being so unusual, and that the scientific establishment in the UK has strongly come down on the evolution explanation line, and because that is now so widely accepted in schools here and is taught as part of the curriculum, but to take the other approach is seen as unusual."

(Educational correspondent, 14 October 2005)

This statement does not only emphasise the unusualness of the story but it also implies a controversy scenario. It suggests that the education establishment, or more adequately Emmanuel College as a small part of it, challenged the consensus view of the scientific establishment that the theory of evolution is the commonly held scientific explanation for the origins of life. In this sense Emmanuel College challenged also the credibility of the scientific community that supports the theory of evolution as a valid scientific explanation for the origins of life and attempted to open the closed black box of "ready made science" (Latour, 1987) in science education. The fact that members of the scientific community defended the boundaries of science (Chapter 4, Section 4.3.3.a) helped to create and sustain the conditions for conflict: it takes two (or more) to sustain an argument.

The literature on news values (e.g. Harcup and O'Neil, 2001; McQuail, 2003) also describes the reference to "human interest" as a news value. Human interest in this sense often refers to something personalized, emotive and sensational (e.g. McQuail, 2003). One of the educational correspondents stressed an emotive component of the story around Emmanuel College – that would build on bad feelings especially by parents who were afraid that their children could be negatively affected or even "indoctrinated" by creationism being taught in science classes and the involvement of a private sponsor in education (this topic was also present in the coverage of the regional/local newspapers included in the sample but also in the statements of campaigners against sponsorship in education (Chapter 4, Section 4.3.2.b and Section 4.3.4.a)). Here the fears mentioned were that children will be religiously "indoctrinated" or "brainwashed" at Vardy-sponsored schools (e.g. Brayshay, 2002, June 5; 2002, July 4):

"I think one of the questions was why were they [stories] newsworthy and I think behind all these stories were those fears. And you couldn't say it straight up; you couldn't say that certain people behind the organisations were forcing their opinions onto young impressionable minds. But I guess that was always the inference behind the stories, the fears of people. "

(Educational correspondent, 19 October 2005)

By referring to "young impressionable minds" that might be forced by "certain people behind the organisations" to take on their opinions this education correspondent points to the idea that it is vulnerable children at the schools that might be negatively affected by a religious sponsor influencing the teaching methods and content. This could be seen implicitly reinforcing the notion that children are empty vessels incapable of making their minds up. If so, this statement challenges the informed choice argument brought forward by the educators of Emmanuel College (Chapter 4, Section 4.3.2.a) and the sponsor of the school (Chapter 4, Section 4.3.4.b.).

The actual issue in this statement seems to be that the unnamed "certain people" are Sir Peter Vardy and the Vardy Foundation sponsoring Emmanuel College and other schools. By describing the story of Emmanuel College as one of "indoctrination" and "brainwashing" the credibility of Peter Vardy and his foundation is challenged as well as the trustworthiness and credibility of Emmanuel College. One of the news reports of this correspondent reported the controversy saying that Vardy-sponsored schools were accused by parents of "brainwashing" the children and the head of one of the schools replied that no religious indoctrination was taking place at the school.

This educational correspondent also had an explanation at hand why the story took off in the national media:

> "I think it was big before that but I think the story snowballed because the national media picked up on it and then perhaps an MP asking certain questions in Question Time..."
>
> (Educational correspondent, 19 October 2005)

In this interpretation the fact that the issue of Emmanuel College teaching creationism in science classes was addressed by Liberal Democrat MP Jenny Tonge in Parliament to Prime Minister Tony Blair served as a catalyst for the amount for the attention and the media coverage about the issue. This also matches the results of the previous analysis (see Chapter 4, Section 4.1.1). What was happening in Parliament was of interest to other news reporters and correspondents. The event of the story of Emmanuel College being addressed in Parliament helped to ascribe a political dimension to the discussion and then became an issue that was covered by a parliamentary affairs correspondent (Kallenbach, 2002, March 14), other general news reporters (e.g. Branigan and White, 2002) and commentators (e.g. Carr, 2002, March 14; Hoggart, 2002, March 14; Johnson, 2002, March 14; Macintyre, March 14).

The involvement of the Prime Minister himself and the fact that he backed Emmanuel College for its good results further contributed to the ascription of newsworthiness to the

story since powerful people and high profile politicians became part of the event. The involvement of prominent and powerful people often adds to the newsworthiness of events (e.g. McQuail, 2003). In Tony Blair's case a different form of expertise – that of a political expert – could be linked (and contested) in relation to a story about science education. It is not unusual that involvement of political experts in debates about science and technology can add a political dimension to the story and therefore increase its news value (e.g. for the involvement of politicians in the story of Dolly the cloned sheep, see Holliman, 2004; for the involvement of politicians in announcements about human cloning, see Nerlich and Clarke, 2003).

### 5.2.3 The issues of the controversy

This section examines the answers of the media professionals regarding the various controversial issues in the debate (Chapter 4, Section 4.2.). Asked specifically about the situation of science education in the UK and if creationism could be a threat in the UK all of the interviewed education correspondents stated that they were not worried about it. Only the science editor saw a worrying tendency – but the science editor also agreed that there was not much creationism to be found in the UK:

> "What are the dangers that Britain will turn out like America with a growing section of the population doubting the ideas of natural selection put forward by Charles Darwin and refined over the years by others since then? I see very little sign of it, I'm pleased to say. But I live in fear – that's my job."
> (Science editor, 13 October 2005)

All of the correspondents agreed that this had to do mainly with the difference of the structure of the education system in the UK in comparison to the situation in the United States. One of the education correspondents said that there might be some more schools in the UK that taught creationism and that had not been picked up by the media but all of the

interviewees saw it as a minority approach that would not concern the majority of UK pupils and parents. These views actually challenged the notion that the story had news value (in respect to this one issue) and also did not correspond with the articles some of the interviewees had written.

For one education correspondent it was not a problem for creationism to be taught in religion classes – this interviewee stated that this was what happened in Catholic and other church schools but also that this is generally not offered as scientific explanation of how the world began (this correspondent attended a Catholic primary school). For this media professional the teaching of creationism would become a problem if it suggested that the theory of evolution was incorrect and creationism was the correct version.

This correspondent also stated that science education and science teaching in the UK was very good, for instance, after being asked if this correspondent thought that the national science education is in trouble through attempts of teaching creationism in science classes:

> "No, I don't. The science that's taught in schools is very good and that's clear from all the international surveys where Britain is up there with Hungary and all the top science countries, unlike other subjects. Actually science is taught very well in the UK."
>
> (Educational correspondent, 25 October 2005)

In one news report about the controversy written by this interviewee it is not very clear how and in which subject(s) creationism appears in the teaching of the school: "Emmanuel College in Gateshead, has come under scrutiny because of its teaching of creationist as well as Darwinian interpretations of evolution."

Another education correspondent stated that the situation of creationism in the UK was not nearly as extreme as in some US states where evolution was under threat of being taken off the curriculum in some states:

"I think it's not quite as perhaps as contentious an issue as it is in America, where you have all the arguments surrounding the Kansas School Boards. That is one of the mainstream arguments, over creationism in education. There is more official support for bringing it into the curriculum. Here it's seen as a bit more of an extreme, almost off-the-wall approach. So it's certainly not considered as mainstream. And I think there's a great deal more scepticism about it here, than there is in the US."

(Educational Correspondent, 14 October 2005)

This educational correspondent also spent some time at Emmanuel College and said that from interviews with teachers and pupils they did not get the impression that anybody was forced into believing that the Earth was created by God. This journalist also mentioned a visit to the school library in which they found books by the biologist Richard Dawkins (see Chapter 4, Section 4.3.3.a) which they regarded as further evidence that various views were tolerated at the school.

None of the interviewed correspondents said in the interviews that they sympathised with the idea of teaching creationist thought in science classes – and none of them thought that any form of creationism could provide a scientifically valid alternative to the theory of the evolution as first proposed by Charles Darwin. Creationism was dismissed as "nonsense" (science editor), a "very old-fashioned view" (education correspondent) or "clearly cranky" (education correspondent).

Furthermore, all of the education correspondents were especially confident in the National Curriculum for England and Wales arguing that it protected the teaching of the theory of evolution and ensured that the fossil record as evidence for the theory of evolution was taught in science classes. Two of the education correspondents also stated that the content of the National Curriculum for Science provided a good science education for children in England and Wales. None of the education correspondents addressed the controversial paragraph about teaching controversy in the science curriculum (see Chapter 1).

However, the previous analysis of media content showed that many of the issues of the controversy around Emmanuel College were somewhat confused in the coverage, for instance it was not always clear in the overall sample where creationism was taught in the school and what the status of the school was (Chapter 4, Sections 4.2.1. and 4.2.3.).

Also in the interviews there was some confusion about how and in which subjects creationism was taught at Emmanuel College (see also Chapter 4, Section 4.2.1.). All of the interviewed correspondents could remember that there was a controversy around Emmanuel College that had something to do with creationism being taught at the school. But in answering the question if the educators at Emmanuel College taught creationist views in science education or in religious education classes none of the interviewed correspondents could answer with any confidence. However, the label that Emmanuel College was a school where creationism was taught was present in the statements of all of the interviewed media professionals. This, some of them stressed after probing about this issue by the interviewer, had mainly to do with the peak of the story being more than two years ago at the time of the interviews. In other words, the interviewees could not remember the specific details of the story. This is one of the limitations of a retrospective analysis of this kind.

Concerning the issues of the controversy, all of the interviewees agreed that one of the central issues behind this controversy around Emmanuel College had to do with the new school type of City Technology Academies. They argued that the connection of state-schools with the private sector and the degree of influence that the sponsors had over teaching practices, curriculum content or the selection of pupils and staff that was the major issue behind the story about teaching creationism in the UK context. Here is an example:

"I think, once again, you have to look at the background of the schools and their connections with the Government in the sense that these privately funded, privately backed, schools – and Emmanuel College is one of them and City Academy is another – were flagship schools that the Government was keen to support and encourage. The emphasis was on private funding and the Government was keen to promote these schools as new ways of helping the disadvantaged children as well because they would just pump lots of money in and encourage businesses and private backers to pump money into them as well. And so, for that reason, they've always been rather controversial [...] And I think, as I understand it, they can actually set their own curricula and certainly have a bigger influence over what they teach. So I think that was the background to the creationism argument really that parents couldn't control what the kids were being taught."

(Educational correspondent, 19 October 2005)

This educational correspondent mentioned especially the links between the government and the involvement of private sponsors as major controversial issue. This statement emphasizes the transactions of financial means ("they would just pump lots of money in") as an easy solution for the problem of disadvantaged children and reason why the government favoured the involvement of private sponsors. As a consequence, the solution to a social and educational problem was the introduction of sponsors from the private sector. This statement also suggests that what is missing in this approach is the educational expertise of the sponsors and the government. This correspondent also referred to the somewhat unclear status of City Technology Colleges and City Academies as to the degree of influence the sponsors have over what the schools teach. But it was made clear in this statement that it is not just Emmanuel College but also other City Technology Colleges and City Academies that were controversial and have been controversial before the case of creationism in science classes appeared (e.g. Boseley, 1986, December 15; Garner, 2001, November 29).

Another education correspondent said that the reason why the coverage of his newspaper focused on Emmanuel College, although other schools were possibly teaching creationism

as well, was that it was also funded by the state and not just by a sponsor and that it was not a school of the independent sector:

"[...] I don't know offhand how many other schools, but I imagine there are some others, [teaching creationism] but the Vardy ones and the Academy ones are the only ones that we've focused on in that context, because they're within the state system. [...] there were concerns, right at the start, that sponsors would have too much of an influence about what's being taught in schools. And the question is the issue has become a real flashpoint, because that's an example of something, which many people, many parents, many teachers would consider quite disturbing, but that was being taught. So yes, it does illustrate the power that the sponsors have, and there have been lots of calls from organisations, including groups like the Liberal Democrats, saying what should be happening is we should be putting this money, the same amount of money, into schools in the private areas, but doing it without the sponsor, to see what happens there, find out how much of a difference these businessmen who don't have a background of education, how much they actually make, or is it the schools themselves that are doing better because they've got 25 million pounds more?" (Educational correspondent, 14 October 2005)

This education correspondent also linked the controversy around Emmanuel College to pre-existing controversies around City Technology Colleges. In this view the story was an interesting illustration of the potential influence of sponsors in education. The second part of the statement also highlights controversy and that teachers and teaching unions (Chapter 4, Section 4.3.2.b. and 4.3.2.c.), campaigners and parent action groups (Chapter 4, Section 4.3.4.b) and politicians (Chapter 4, Section 4.3.5.) challenged the educational expertise of the private sponsors. However, another educational correspondent noted that the debate around Emmanuel College could also be used to specifically attack the government's educational policy:

" [...] if you did want to bash Tony Blair for his flagship City Academies you could do so by covering a story on creationism at Emmanuel College. So you're not just criticising the school there really; you're actually using it as an example of how it's one of Tony Blair's flagships."
(Educational Correspondent, 19 October 2005)

The previous analysis confirms this view and that various expert sources such as teaching unions (Chapter 4, Section 4.3.4.a.) and members of the opposition (Chapter 4, Section 4.3.5. and 4.4.1.) attacked the government and blamed Tony Blair personally for his "enthusiasm" for this educational policy as the cause for English schools teaching creationism. This result confirms the findings of an analysis of popular press accounts of education stories by MacMillan (2002). MacMillan concludes that stories about education in the popular press are only rarely about education per se but that education is often used as a battlefield for political debate, as a vehicle to criticize the government and especially to apportion blame and determine who is guilty, for instance, for moral decline, social disruption and violence among young people.

In sum, in the case of Emmanuel College it was partly the fact that the school was sponsored by the Vardy Foundation that led to suspicion and criticism from some of the quoted experts (Chapter 4, section 4.3.), coalitions forming against Emmanuel College (Chapter 4, Section 4.4.1) but also from commentators in the newspapers (for instance, No byline, 2002b, March 9). Not all of the interviewees were necessarily opposed to the new school type or to bringing private money into state education. But all of them agreed that the influence of the sponsors needed to be carefully monitored and watched and the developments needed to be assessed.

The story of whether and how creationist explanations were taught in this particular school would follow from the issue of new privately sponsored state-schools and provide an interesting and illustrative example for the potential consequences of sponsorship influence in education that was taken up also in articles that were published after the main controversy took place from March 2002 to May 2002 (Chapter 4, Section 4.2.2). This story could also be used to attack the educational policy of the government and apportion blame. For these media professionals (most of them were educational correspondents), the story of Emmanuel College was therefore primarily built up on the issue of sponsorship involvement in state-education which was controversial before the first articles about

Emmanuel College appeared in the UK press. However, the previous analysis suggests that newspaper reporting about the school started after it was reported that the school rented out room for a creationist conference (Chapter 4, Section 4.1.2.).

Although the OFSTED report of the school also played an important role as evidence for the good results of the school in the debate around Emmanuel College and although the credibility of the report and of the education inspectorate OFSTED itself had been contested by various of the quoted experts (Chapter 4, Section 4.2.3.) none of the interviewed correspondents mentioned that the status of OFSTED had been challenged in the course of the debate around the school or seemed to remember any disputes around the education watchdog, also after being asked about the role of OFSTED in this debate. This might be since the debate around OFSTED was not an ongoing controversy but the only contentious issue that was "resolved" within the sample period (Chapter 4, Section 4.2.3.).

### 5.2.4. Expert sources quoted by specialist correspondents

The content analysis demonstrated that a range of different expert sources were quoted in sample (Chapter 4, Figure 4.3.). The cited expert sources addressed various issues of the controversy with different arguments and were also described in different ways (Chapter 4, Section 4.3.). The next sections explore if the different specialisms of the media professionals that reported the case had an influence on the selection and presentation of the quoted experts. Table 5.2. shows which types of expert sources were cited by the various specialist correspondents in the news reports of the sample. Different colours were used to distinguish the numbers and percentages of quoted expert sources by specialist correspondents from the overall figures. The analysis will focus on the expert sources quoted by educational correspondents (red) and science correspondents (green) and

**Table 5.2.: Types of experts quoted by special correspondents in news reports**

| | | Types of quoted Expert Sources | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Type of Correspondent | Number of Articles | Scientists & Scientific Institutions | Education Professionals | NGOs & Activists | Politicians & Authorities | Religious Experts | Pupils / Parents | Media Professionals | Total |
| Education | 33 | 10 (15.6 %) | 24 (37.5 %) | 14 (21.8 %) | 11 (17.2 %) | 2 (3.1 %) | 3 (4.7 %) | - | 64 (100 ) |
| Science | 12 | 20 (55.6 %) | 1 (2.8 %) | 6 (16.6 %) | 3 (8.3 %) | 2 (5.6 %) | 1 (2.8 %) | 3 (8.3 %) | 36 (100) |
| Foreign | 6 | 5 | 6 | 5 | 1 | - | - | - | 17 |
| North of England | 1 | 1 | 3 | - | - | 1 | 1 | | 6 |
| Religion | 2 | - | - | - | - | 2 | - | - | 2 |
| Parliamentary | 1 | - | - | 2 | 1 | - | - | - | 3 |
| Total articles by specialists | 55 | 36 (28.1 %) | 34 (26.6 %) | 27 (21.1 %) | 16 (12.5 %) | 7 (5.5 %) | 5 (3.9 %) | 3 (2.3 %) | 128 (100) |
| No byline | 56 | 24 (15.5 %) | 42 (27.1 %) | 31 (20 %) | 26 (16.8 %) | 19 (12.3 %) | 13 (8.4 %) | - | 155 (100) |
| Overall | 111 | 60 (21.1 %) | 77 (27.1 %) | 58 (20.4 %) | 42 (14.8 %) | 26 (9.2 %) | 18 (6.3 %) | 3 (1.1 %) | 284 (100) |

compare these to the figures of expert sources quoted by specialist correspondents to expert source quoted in articles with no byline (orange).

In the case of the foreign, North of England, religion and parliamentary affairs correspondents the values are too small to be significant.

Table 5.2. shows that the education correspondents (33 articles written in the sample) quoted experts from the educational sector most often (24 quoted experts – 37.5 %), but also experts from activist groups and NGOs (14 quoted experts – 21.8 %) as well as political experts. Politicians, officials and representatives of authorities (11 quoted experts – 17.2 %) were quoted more often than scientific experts (10 quoted experts – 15.6 %). However, they also quoted a few pupils and parents (3 quotes – 4.7 %) and religion experts and authorities (2 quoted experts – 3.1 %).

There is a difference compared to correspondents specialised in science coverage (12 articles written in the sample). Science journalists quoted scientific experts and institutions (20 quoted experts – 55.6 %) most often but also represented some voices from activist groups and NGOs (6 quoted experts – 16.6 %) and also some from the political sector (3 quoted experts – 8.3 %), and religion experts (2 quoted experts – 5.6 %). The science correspondents were only quoting one expert from the educational sector (2.8 %) and only one pupil (2.8 %) but the science correspondents were the only ones that also quoted other media accounts or media professionals (3 quotes – 8.3 %).

Here it is noteworthy that both, the educational and science correspondents quoted a broad range of different experts, but the emphasis on experts from their own respective field of expertise is prevalent. This can have an impact on the framing of the issue and which of the various controversial aspects reported in the debate are addressed in their news reports (Chapter 4, Section 4.2.). This is especially striking in the case of the science correspondents where more than half (55.6 %) of the quoted experts are scientists. However, the range of experts quoted by education correspondents is broader than the

range of experts quoted by science correspondents, but both types of specialist correspondents had only very little quotes from religious expert sources and pupils and parents. Compared to the news reports written by the specialist correspondents the news reports without byline quoted less scientific experts (28.1 % in news reports written by specialist correspondents; 15.5 % in the news reports without byline) but more political experts (16.8 % in no byline reports; 12.5 % in specialist correspondent reports) more religious figures (12.3 % in no byline articles; 5.5 % in specialist correspondent reports) and more parents and/or pupils (8.4 % in no byline articles; 3.9 % in specialist correspondent reports). The percentages of quoted education experts (27.1% in no byline articles; 26.6 % in specialist correspondent reports) and of NGOs, campaigners and activists (20 % in no byline articles; 21.1 % in specialist correspondent articles) are similar. These results suggest that different categories of experts are seen as more relevant for reporting the debate around Emmanuel College by various types of specialist correspondents. The category of educational experts (that contains all Emmanuel College educators, teaching unions and individual teachers, see Chapter 4, Section 4.3.2.) is the group of experts quoted most often in all news reports (apart from the news reports written by science correspondents who quoted scientific experts most often).

The differences between the news reports written by specialist correspondents and the news reports without bylines suggests that education correspondents could have focused on more educational aspects of the debate, as could be expected science correspondents more on the scientific aspects of the debate and the general news reports could have also reported and focused on the political aspects and dimension of the debate and issues related to religion.

It is also noteworthy that in news reports without byline NGOs, campaigners and action groups are quoted more often than scientific experts. This result suggests that concrete calls for action by the NGOs, campaigners and action groups might receive more attention from general and political affairs correspondents than comments or the opinion of

individual scientists or scientific institutions. (Section 5.2.7. is going to explore if the distribution of quoted experts has something to do with journalistic practices.)

The reliance of science journalists (more than half of the experts quoted by science correspondents are scientific experts) on scientists as experts is documented in the literature on science in the media (e.g. Shepherd, 1981; Goodell, 1987; 1989; Dornan, 1990; Hansen, 1994; Nelkin, 1995; Conrad, 1999; Holliman, 2000; 2004) whereas the findings on the experts quoted by education correspondents extend the current literature in this under-researched area of the newsroom.

The results suggest that for the science correspondents scientific experts played an especially important role in the story of Emmanuel College and provided the necessary expertise and authority to comment on the debate. As the analysis in Chapter 4, Section 4.3.3. showed most of the quoted scientific expert sources challenged the idea that creationist theories provide a valid alternative to the theory of evolution and should not be taught in science education. It is therefore likely that the articles written by the science correspondents focused on the scientific dimension of the controversy and challenged the scientific status of creationist explanations (this will be further investigated in the following sections). In contrast, the range of the experts that are quoted by the education correspondents is much broader. This result suggests that the educational correspondents considered more and different types of expert sources as being relevant in the story of Emmanuel College. It might be that different types of experts are quoted speaking with authority about educational issues. This might also result in various controversial issues of the debate around Emmanuel College being treated in articles written by education correspondents.

What follows is that the type of correspondent that reports stories about science education will affect the selection of experts sources that are represented in the accounts and thereby it is likely that articles written by various types of correspondents have different angles on particular aspects related to science education. The following sections are going to

examine the statements of the interviewed media professionals about which expert sources they quoted, how they were selected and the issue of credibility in the selection of expert sources.

### 5.2.5. Experts and notions of credibility and relevance

The findings in Table 5.2. were supported by data from the interviews. Asked what the relevant experts in education news were, the interviewed education correspondents present a fairly consistent account on the kinds of experts they considered relevant in education stories in general. All of them agreed that the voice of the teaching profession generally needed to be represented. Here they named teaching unions such as the National Union of Teachers or National Association of Head Teachers or individual head teachers. These were seen as having valid and reliable expertise in teaching and education matters through their role and professional experience and three of the correspondents noted that because of their professional experience they are credible experts in education stories.

A second group of experts that were mentioned by all educational correspondents represents the government's point of view. Here the educational correspondents named experts such as spokespeople for the Department for Education and Skills or from OFSTED. However, the education correspondents agreed that the selection of expert sources depends on the actual story they are writing about. If the story is about the government and educational policy then the relevant experts are generally political experts and authorities, for instance representatives of the government or the political opposition or of the then Department for Education and Skills. However, if a story is about a specific school the education correspondents prefer accounts of experts that are as close to the school as possible, for instance:

"Ideally, you speak to them [people involved in the story] and the nearer you can get to the people who are actually directly involved, the better, yes. So if it was a story about a particular school, you'd want to talk to the Head Teacher and the Governors at that school, if you can get through to them! If it's a Government story, if the Government's doing something, then you want to talk to the Government Department of Education." (Educational Correspondent, 1 February 2006)

Here, the head teacher of the school was generally mentioned as the first expert source they would like to talk to, then other teachers at the school (depending on the specific story), pupils at the school, also parents of pupils at the school and the representatives or spokespeople of the local teaching unions or the local education committee to get something of the local background "gossip" (Educational Correspondent, 14 October 2005).

Here is one answer of an education correspondent who was asked about the specific experts that were relevant in the story about Emmanuel College and how this interviewee assessed the credibility of the interviewed experts:

"[...] The direct sources were the schools involved, the teachers, the local teacher union. I don't think the scientific community, so people like Richard Dawkins. Science teachers, national science teacher organisations. And the government and OFSTED as well, because it's been interesting to see how the Prime Minister has affected the schools, and how the OFSTED report for the schools has been very positive.

[...] generally we'd be going directly to the people involved or as directly as we can. [...] It depends on how close they are to it. A lot of the discussion about what has been happening in the Vardy schools has been very second hand. You get reports saying, they only teach in this way, which isn't fair or true. [...] how close they are to the story, so if they're talking about whether a school teaches something or not, and they're one of the teachers, that gives them a great advantage over someone outside the school, or a parent or somebody who wasn't actually there."

(Educational correspondent, 14 October 2005)

Here the notion is that the closer the expert is to the school or event in question, the more credible is its account. The directness of the account is very important and first-hand

accounts are more valuable and credible to educational correspondents than hearsay and second-hand accounts about what is happening at schools. In this regard accounts of the scientific community and especially of the scientific expert Richard Dawkins were less important than the authentic and valid accounts of expert sources that were directly involved in or related to the story about teaching creationism at Emmanuel College. Here a hierarchy of relevance based on the directness, authenticity and validity of the accounts of the education and political experts and pupils and parents of pupils at the school outvalues the importance of the credibility and reputation of the scientific experts (see the introduction of Becker's (1967) concept of hierarchies of credibility in Chapter 2, Section 2.3.3.).

This statement is very similar to the responses of the other education correspondents. All of them thought the head teacher (Nigel McQuoid) was one of the most important experts to talk to, then other teachers at the school (two educational correspondents note science teachers were especially relevant in this case) and at least three of the education correspondents visited Emmanuel College or talked to Emmanuel College staff on the phone.

The representatives or spokespeople of local teaching unions or local education committees were also mentioned by the other education correspondents for getting some information about the local context and previous events that were relevant for the story.

All of the interviewed education correspondents agreed that the official view on Emmanuel College was also important to be represented in this story.

Relevant experts that were also mentioned in this regard were OFSTED (because of the positive report about Emmanuel College), Prime Minister Tony Blair (because he was personally involved in the story about the school and backed it for its good results) and the then Department for Education and Skills (for its expertise about the school type of City Technology Colleges/City Academies and curriculum requirements). Two education

correspondents also noted that Peter Vardy or spokespeople of the Vardy Foundation were relevant experts that needed to be interviewed or quoted in this specific story.

Two educational correspondents also mentioned that they represented views that strongly opposed the view of Emmanuel College educators or the Vardy Foundation to provide a balanced account. Here they mentioned spokespeople of humanist and secular organisations (but no scientific experts). Three education correspondents also said that pupils or parents of the pupils at Emmanuel College or Vardy-sponsored schools needed to be interviewed in this story.

However, especially the head teachers and spokespeople of teaching unions were not only quoted for the directness of their accounts but also for their shared professional and specialised expertise in dealing with education in practice, for instance in teaching the National Curriculum. The education correspondents were also interested in finding experts about specific issues that are often related to specific schools. The enactment of the National Curriculum, for instance, is not the same in all schools and education correspondents are interested in the specific experiences and expertise that an education expert teaching at a specific school made with a particular approach. Head teachers and educators with long teaching experience as well as spokespeople for teaching unions therefore have the credibility of experienced professionals in the educational sector.

A look at the articles the interviewed education correspondents wrote in the sample confirms the explanations on expert selection and expert representation of education correspondents regarding Emmanuel College staff and Nigel McQuoid, official views and representatives of teaching unions. However, education experts from local education committees were not present in the sample (but it is possible that education correspondents talked to them for background information but did not quote them in the articles). Also parents of pupils and/or pupils were quoted in only one case (and only in three cases in the 33 articles written by education correspondents – see Table 5.2.).

Three of the education correspondents said that they have established contacts with experts from the education world. In practice this means they know where and how to get the voice of the profession and how to get official views on developments concerning education, for instance:

"There's OFSTED, the teacher unions, the [unclear] Association, the Government, the various political parties, pressure groups... yeah. We're in touch with them all the time. [...] You know where to go to get the voice of the profession, the voice of the political parties. It's slightly more difficult if you want the voice of parents because there is a national confederation of parent teachers' associations, but you're more likely to go to a particular place, a particular area, and sort of choose people more or less at random really, because that's what you want is a general view. But yes, there's lots of place you can go to. You know those people to talk to, yes." (Educational Correspondent, 1 February 2007).

Usually education correspondents call their expert contacts and have the relevant phone numbers in their contact books. However, the educational correspondents said that contacting and selecting experts can be more difficult if the story is about a specific school and the correspondents first need to find out who the relevant experts are and then need to get in touch with them. Sometimes schools also deny access to journalists (but this was not the case in the story of Emmanuel College, see 5.3., except for the science editor). There are no organisations that represent the general view of parents or pupils and it is therefore sometimes more time consuming to go out and look for specific parents or pupils to quote. Time pressure in producing stories can therefore influence which experts are contacted and also how long they are interviewed.

One noteworthy exception in approaching stories and also selecting experts was the view of an educational correspondent writing for a regional/local newspaper. This correspondent emphasized that the importance of regional/local newspapers is seen in being part of local communities. This was described as an essential factor of difference in comparison with

national newspapers. Being part of a local community also provided the opportunity – and in the view of this correspondent also the responsibility – to report diverse views from within that community which also had an effect on the selection of sources. This correspondent said that the representation of voices from the local community is partly the job of the local newspapers. This educational correspondent was also the only one that referred to the formation of one of the various action groups that formed promoting varying views in the controversy around Emmanuel College (see Chapter 4, section 4.4.). Here this interviewee referred to an action group formed by parents to avoid a new Vardy-sponsored City Academy being established:

"I think it shows how powerful the media can be when action groups get together and as soon as their cases are reported in the media they're picked up. And that generally tends to be when people are powerless so I think that just shows how important the role of the media is in terms of ensuring that ordinary people have a voice. Because it represents the little people often and they don't always get a chance to be heard.
[...] I think the national newspapers tend to get interested when there's a big story there basically. And they do a good job in different ways; they're just different to local and regional papers. But I think it's important that local papers are there for people to use to get their voices across basically, whether that's writing a letter to their local paper or forming an action group and having their voices heard that way."
(Educational correspondent, 19 October 2005)

In this instance the formation of an action group does not only have news value for this correspondent it is also seen as part of the responsibility of regional/local newspapers to make the voices of ordinary citizens ("the little people") heard. This statement therefore refers to the democratic function of news media by representing the voice of the people. The action group may also have deliberately targeted the regional/local newspaper and made use of it through direct action and contacts to local journalists.
However, this is an interesting statement also in terms of credibility, relevance and the selection of experts. This means that this correspondent's criteria for the selection of experts are slightly different from the criteria of the correspondents writing for national

newspapers. Although some of the other educational correspondents were saying that it is important to consult local expert sources such as spokespeople of local education committees or teaching unions this is the only statement that argued for the inclusion and representation of the voice of non-expert and "ordinary" citizens in news accounts. The reason for this according to the interviewed correspondent is the nature of regional newspapers and the view that they have to be rooted in the local communities they are writing about.

A look at where the pupils and parents (the category of the most "ordinary" experts) were cited in the newspaper sample confirms this view. 10 of the 20 quoted parents and pupils and three of the four spokespeople for a parent action group against Vardy-sponsored schools were quoted in the two regional/local newspapers in the sample (see Chapter 4, Section 4.3.4.b and 4.3.7.). This is a comparatively large amount since the two regional/local newspapers (out of the 20 newspapers included in the sample) contain more than half of the quotes from parents and pupils. This can be seen as an indication that the criteria for expert (or non-expert/citizen or community expertise in this regard) selection can also be influenced by the type of newspaper the correspondents are writing for. Regional/local newspapers take voices from their local communities more seriously also in order to gain and enhance their own credibility within their local community. This statement suggests that the nature of the newspaper the correspondents is writing for, if it is a regional/local or national or specialist newspaper, can have an influence on journalistic practice and the way experts are selected and represented in newspaper accounts.

This finding is very similar to the conclusions of Aldridge (2007) who asserts that all journalists have an "imagined community" (Anderson, 1991) in mind when they are producing media accounts, but that journalists working for regional/local newspapers feel closer to their readership and are often also proud of being members of particular local communities and feel responsible for the representation of the voices of members of the local community they are writing for.

Examining the interview data one finds that the science editor named scientists and education policy makers as his main expert sources. This interviewee said that most of these were academics hostile to the idea of teaching creationism (a look at the articles the science editor wrote in the sample as well as the analysis presented in Chapter 4, Section 4.3.3. confirms this view). The science editor also has a list of established contacts. The credibility that the science editor grants to these experts is in this case based on knowledge, reputation and status among their peers as well as trust and personal acquaintance. In this sense two forms of capital are relevant in the selection of expert sources: social and cultural capital (Bourdieu, 1986). Here is the science editor's answer to the question where this correspondent got the information from about the Emmanuel College story and how this correspondent assessed the credibility of the expert sources he talked to:

"[...] The usual sources: I phoned people who knew about it. [...] It would be scientists involved and education policy makers involved in this case. The school itself wasn't talking, I remember that. So you had to slightly skirt round it. But it would be academics that I would have spoken to, most of whom are hostile to the idea.

[...] I've got a list of contacts that I use regularly. [...] It depends on the source but if one of my sources is on my list of contacts these are people I trust. Often you get two different perspectives which is fine. You can write on the other hand so and so said such and such. They're on my contact list because I trust them and so far, so good. " (Science editor, 13 October 2006)

In contrast to the statements of the educational correspondents that underline the importance of the directness of the accounts of the quoted experts the science editor focused on a relationship based on trust with experts that the science editor reckoned to be knowledgeable about the case. This is also confirmed in the literature (e.g. Hansen, 1994). For instance, the science correspondent Detjen (1995: 62) underlines the importance of establishing relationships of trust between science correspondents and scientific expert sources:

"I cannot emphasize strongly enough the importance of developing a working relationship with reporters. If I have 15 phone messages on a busy day, I am far more likely to return first the calls from people I know."

Also, the directness of the quoted account was not as important as the fact that the science editor trusts the expert sources.

In the articles written by this correspondent scientific experts, secular action groups, religious experts and the Liberal Democrat MP Jenny Tonge who confronted Tony Blair in Parliament were quoted. All of the quoted experts in these articles challenge the credibility of Emmanuel College; the article is not balanced in terms of the conventional journalistic norm of experts who are for and against a particular position. In this regard the expert sources quoted by the science editor were not as close to Emmanuel College as the expert sources quoted by the education correspondents. The science editor's approach therefore appears less proactive than that of the education correspondents that had to make an effort to contact the school directly (see Section 5.3.). One of the articles of the science editor quoted from the prospectus of Emmanuel College (which is available online). The quote in this article suggests that creationism is taught is science classes. Moreover, the science editor's statement that "the school itself wasn't talking" is in contrast to the statements of three education correspondents all of whom said that staff at Emmanuel College was very open towards journalists and access to the school was granted to all education correspondents that wanted to visit it. This suggests, although there is no direct evidence to confirm it, that the school may have been selective about which journalists it choose to speak to.

Although the science editor refers to the journalistic norm of balancing accounts in his statement ("often you get two different perspectives which is fine") the trust the science editor puts in the established expert contacts seems to outweigh the norm of presenting an opposing view in a balanced way. It also suggests that they agreed with the consensus view

about evolution. In the resulting articles a range of different experts (scientific experts, religion experts, politicians and humanist activists) were quoted but only one quote from Emmanuel College was in the articles to counter their account.

The science editor did not make further statements about the selection of expert sources and the assessment of their credibility. However, the research literature on the practice of science journalism states that science correspondents generally rely strongly on scientific experts and that the credibility of (scientific) experts depends for instance on the institution they are affiliated with, their research and publication record and their reputation in the academic or scientific community (Shepherd, 1981; Goodell, 1987; 1989; Dornan, 1990; Hansen, 1994; Nelkin, 1995; Conrad, 1999). Hence, what scientific experts know about a subject may be an important factor for the establishment of trust between science correspondents and scientific experts.

Specialist correspondents generally have established contacts or a contact book that they can rely on and that have a good track record in the accuracy and reliability of the information they provided (see also Hansen, 1994; Nelkin, 1995; Conrad, 1999). Trust in expert sources builds up through their ability of providing reliable and accurate information over time (Holliman, 2000). Expert sources that are not trusted by the media professionals have therefore less chance to makes themselves heard in news reports (see also Linne, 1993). The question here is how trust is established and how contacts to expert sources are initiated in the first place. In this sense, journalist-expert relationships can be characterized as symbiotic[35] in character when they work well (e.g. Goodell, 1987; Hansen, 1994; Nelkin, 1995; Conrad, 1999; McQuail, 2003; Holliman, 2000; 2004; 2007). This means not only the correspondent but also the expert source might also benefit from media exposure, e.g. media prominence might help scientific experts to attract research funding more easily (Weingart, 1998; Holliman, 2000). But if the expert source does not

[35] Layton (1976: 688) about the analogy of symbiosis in organic nature: "In symbiosis two different organisms live together in a mutually beneficial relationship".

agree with the representation of her or his statement or the way it is presented they might cease to collaborate with the correspondent in the future which would result in the loss of one of the most important resources for the professional journalist. For instance, for science writers that means:

> "Experienced or not, science journalists are constrained by their concern about future access to scientific sources." (Nelkin, 1995: 123)

The relationship between a journalist and an expert is (at least) a two-way process[36]; the journalists need to be able to rely on the accounts of their experts and the experts need to trust the correspondents that their views are not misrepresented (e.g. Hansen, 1994). In the case of the science editor trust, trustworthiness and reliability, as well as personal acquaintance and experiences with the experts, seem to be determining factors in the relationship between the established expert and the media professional and can have a positive effect on the representation and credibility of the expert source in the news accounts. However, they also need to be knowledgeable about the particular subject and generally are also established experts in their field. Experts may also be selected for the views they hold or are perceived to hold about a particular issue. Nonetheless, experts that are personally familiar and acquainted to media professionals and have established relationships to the various correspondents that are covering their field of expertise can have a strategic advantage in comparison to unknown or unfamiliar experts in making their voices heard and receiving a credible representation. This combination of social and cultural capital (see Bourdieu, 1986) works well for those who gain regular access to media professionals. Those who don't – for instance "the little people" – have to rely on other access points, e.g. the democratic function of "the fourth estate".

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[36] Institutions and scientific journals can also play a role in terms of promotional strategies (Gandy, 1982; Nelkin 1995; Holliman, 2000; 2004; 2007).

The process of looking for expert sources to contact, question, and quote worked very differently for the freelance writer. The freelancer got an assignment to do a feature on creationism in British faith schools from the education editor of national Sunday newspaper. This media professional said that this interviewee is less well-connected in the area of education and does not have a pool of expert sources that can be relied on in this particular story. However, the freelancer mentioned that freelancers are in informal networks of freelancing writers who frequently send one another requests for contacts in their non-specialist areas and cooperate in the use of each other's field of specialism (here it is possible that the use of emailing and the internet provides practical opportunities for online networking, the freelancer mentioned the use of emails and internet search engines frequently):

"For your information, there is an informal but very active network of freelancers like myself, who will frequently send one another requests for contacts/pundits/spokespeople in our non-specialist areas."

(Freelancer, 20 April 2006)

This quote points to the importance of the processes of social networking, also in newsgathering (see Castells, 2000). The freelance writer was briefed by the editors of the newspapers this interviewee was writing for but they did not give the freelancer contacts of experts the freelancer must or should interview or quote. After the briefing, which was based on the reading of a "sheaf of press cuttings" the freelancer got from the newspaper and the use of internet search engines the freelancer had to sit down and think about which expert sources were particularly relevant, easily accessible and possible to get hold of in a very short space of time. Tools that assisted the freelancer in doing so were internet search engines, the phonebook and the telephone. The freelancer summarised this process the following way:

"As you can see, the choosing of sources is hardly a science but more to do with logic, lateral thinking, experience (that is, knowing how to obtain information), coincidence and a degree of practicality and pragmatism about how, where and when you conduct interviews. It's an imperfect world – and you must move fast." (Freelancer, 20 April 2006)

This statement suggests that time-efficiency can have an influence on the consultation of experts. Also, the potential pool of expert contacts grows with every assignment and the investigation and newsgathering strategies develop with the experience one has on the job. The freelancer, who had written six education stories before he got this assignment, said that it is "pretty much de rigueur" for education stories to quote an expert source that represents the voice of the profession (the freelancer mentions teaching unions such as the National Union of Teachers) and the voice of authorities (in this case the Department for Education and Skills), which is consistent with the view of the education correspondents on expert selection. The freelancer asserted that the two do not necessarily agree and stated that this would be "perfect" for a journalist. This statement emphasizes, once more, the necessity of balancing accounts and the news value of disagreement, conflict and controversy (e.g. Glasgow University Media Group, 1976; 1980; Miller, 1999; McQuail, 2003; McNair, 2004).

In contrast to the specialist correspondents who have some orientation through past experience and personal acquaintance in assessing the credibility of their established contacts, this non-specialist correspondent has to evaluate the credibility of expert sources in each case. Here the freelancer based the judgement on institutional positions and the validity of the account of the expert sources. One interesting criteria in this account is that representatives that are used to deal with the press because of their function are awarded a "degree of credibility". This is similar to the statements of educational correspondents that saw spokespeople of teaching unions and head teachers as credible expert sources because of their professional and specialized experience on the job of teaching in practice.

But, the freelancer stated that also the subjective impression gained from the interaction with the expert source(s) had an influence on how the experts' credibility is assessed. Also previous accounts of newspapers and websites that the freelancer considered credible played a role in the assessment of the credibility of experts suggesting evidence of (re)construction of meaning over time (Kitzinger, 2000). Here the freelancer made a particularly interesting statement when it comes to the credibility of the quoted experts in newspaper articles:

> "In a sense, the credibility comes from the journalist's own assessment, the text in between the quotes." (Freelancer, 20 April 2006)

This confirms the results of Chapter 4, Section 4.3., that descriptions of expert sources and particular ways of framings quotes can add or challenge the credibility of a quoted expert in a newspaper article.

This media professional was free to decide what expert sources needed to be quoted but practical requirements such as time pressure and availability influenced the processes of contacting and selecting expert sources. The way this interviewee assessed the relevance of expert sources was close to the understanding of the educational correspondents. In assessing the credibility of the expert sources the freelancer had to rely on his own professional expertise but could get orientation using previous newspaper and other media accounts and judged experts on how they were presented there. Here, the freelancer could draw on the experience of correspondents that covered the story previously (Kitzinger, 2000; Luhmann, 2000).

In sum, among the different interviewed media professionals different notions about credibility and relevance of expert sources can be found. For instance, whereas the education correspondents valued the directness, validity and authenticity of their expert

sources, the science editor valued the knowledge and status of the quoted expert sources and trust in the expert sources was more important than the directness of the expert sources to the story. Here we find different hierarchies of credibility (Becker, 1967 – see Chapter 2, Section 2.3.3.), based on academic credentials and social and cultural capital (Bourdieu, 1986) and different hierarchies of relevance, based on the directness of the accounts, its validity and authenticity. How these play out in hectic and short production periods affects the overall framing of issues in the resulting articles. In this sense a retrospective analysis of a large sample of reports combined with a study of production, such as presented in this thesis, can provide important and valuable insights about how various criteria for the selection of expert sources by various kinds of journalists affect the resulting articles in the newspapers. Consequently what kind of journalists or correspondents, whether they are general news reporters or specialist correspondents and if they are specialist correspondents their precise specialism affect how the final product, the newspaper article, looks like, how the issues in their accounts are framed and which expert sources are quoted in the article (Allgaier, 2006).

### 5.2.6. Use and functions of expert source quotes

This section investigates the use of expert source quotes by the interviewed media professionals. Direct quotes by expert sources are important features in news reporting and can be used in different ways by journalists. The use of quotation marks indicates that what is said in a news report is a valid, direct and accurate account of the expert sources' words. However, the material will be selected by the media professionals and the questions that experts are asked are generally also selected by media professionals. Interviews with expert sources will in most cases be edited, paraphrased and reduced to a "soundbite" or a quote may serve as a "punch line" in a newspaper article (see Chapter 2, Section 2.3.3.).

The case of two scientific expert sources that were arguing against the evidence underlining the validity of the theory of evolution in Chapter 4, Section 4.3.3.b. showed that journalists have the possibility to either decontextualize quotes or frame the quoted experts in particular ways that might challenge their credibility and the credibility of their argument in the readers' perception (Allgaier, 2004).

Asked about the selection of quotes of their expert sources the science editor and the educational correspondents agreed that there are the ones that are "dramatic" and that "give a bit of life" to the story that needed to get in the story. Less exciting bits and everything that is jargon, dull or boring needed to be paraphrased through the journalist. Several of the interviewed correspondents said that the most "colourful" quotes are taken to make the piece as lively as possible. One of the educational correspondents said that quotes by sources are selected by mainly two criteria: "relevance" and "how interesting they are for the actual story." Another education correspondent stressed particular framings that can be achieved through the order of quotes:

"I think every story that you write needs an angle; you need to be looking at it from a point of view. I don't mean a person's point of view but that it needs an introduction and the quotes that you use would then go in a particular order, depending on whatever the angle of the story is. In terms of quotes you try and pick the most colourful quotes that you can and the information that you use is obviously the most succinct facts that you can get out of people as well. Space is of the essence and you don't have room to be using people's eulogies." (Education Correspondent, 19 October 2005)

This correspondent also noted the practical limitation of space and the need to edit interviews. Unnecessary information must be avoided and facts are attributed to interviewed people. The freelancer also stressed various purposes and functions in the use of quotes:

"As a reporter rather than a columnist, I do not usually express my personal views in print but rely on the voices of others. [...] With skill, you can counter one pundit's view with another, contradict with facts what a source has just told you, stitch the quotes together in a particular way to achieve a particular effect. [...] I will choose those [quotes] that add controversy, surprise, humour and avoid those that are riddled with jargon and dull. [...] Clearly, each quote also has an editorial purpose and a function within the story; it introduces a particular subject, makes a particular point, leads the reader from one way of thinking to another, provides a counter-view to that expressed by somebody else." (Freelancer, 20 April 2006)

This statement emphasises that quotes are selected by reporters (and other media professionals) in order to achieve certain effects and serve particular (editorial) purposes, for instance to achieve the journalistic norm of balance by presenting two opposing views on an issue that is contested. This statement suggests that the freelancer might also make use of the voice of others to express the own opinion without being liable (see also Tuchman, 1972).

Quotes can also be framed in a particular light. For instance, the credibility of an expert source can be challenged if a "fact" follows a quote and "contradicts" the account of a source. The way the quote of a creationist who described evolution as materialist worldview and argued for creationism being scientific was framed shows another use of quotes that can challenge the credibility of an expert source's account. This quote was countered with quotes from five credible expert sources that all opposed the account of the pro-creation source (Chapter 4, Section 4.3.4.c.). In this sense, media professionals are aware how quotes of expert sources can be used to challenge their credibility.

The example of a quote of pro-creation scientists (Chapter 4, Section 4.3.3.b) showed that journalists must also be knowledgeable about and acquire the skills of how eliciting particular types of quotes they want to use in their reports. These skills develop with the professional experience of the journalists. The pro-creation scientist in this example was asked how he accounted for the visible evolution of viruses. The expert source responded that bacterial resistance to antibiotics can be explained by evolution. In this sense the

writers of this article found a way how a scientific expert that is arguing for the scientific validity of the theory of Intelligent Design (Chapter 1) could be quoted backing the explanatory power of the theory of evolution. This suggests that it is part of the professional experience of media professionals to know what kinds of questions they have to ask in order to get the kinds of responses they would like to quote in an article (Conrad, 1999; Steward et al., 2001; Richardson, 2007).

Furthermore quotes also serve practical purposes, such as making a piece more readable, lively or entertaining. Quotes can serve as a punch line and add humour to a story (Steward et al., 2001). The use of opposing quoted accounts also underlines the news value of conflict and controversy of a story. Furthermore, a quote from an authoritative expert source can be used to introduce a subject in a knowledgeable way and add credibility to the newspaper account (e.g. Nelkin, 1999; Conrad, 1999).

In sum, there is not a "neutral" way of selecting and presenting quotes of expert sources and the interviewed media professionals were aware that certain ways of combining directly quoted statements of expert sources can be used to achieve particular effects. The statements of all interviewed media professionals on the use of quotes were very similar and there were no manifest differences in their statements along their different areas of specialism. However, the analysis of quotes by expert sources showed that journalists used quotes in different ways in the sample (Chapter 4, Section 4.3.).

### 5.2.7. The journalistic norm of objectivity

This section is going to examine the notion of objectivity in the interviews with media professionals. The idea that "objective" news reporting is possible has been challenged consistently in the academic literature (e.g. Hemanus, 1976; Nelkin, 1995; Allan, 2000; Schudson, 2000; 2001; 2003; Strakey, 2006). However, the norm of objective reporting still serves as a professional ideal that is employed by journalists for various reasons, but

can take on different forms in the practice of journalism (see Chapter 2, Section 2.3.4.). It involves criteria such as factual, neutral and balanced reporting which is often related to a general "fairness" of accounts, accuracy, and impartiality to ensure that bias or sensationalism is avoided (McQuail, 2003).

The importance of balanced reporting was already mentioned in some of the statements by the interviewed media professionals presented so far. This section is going to have a closer look at the underlying notions of objectivity that emerged in the interviews with special correspondents and investigates whether these notions of objectivity had consequences for balanced reporting in this case.

In this instance this section will make use of Hallin's (1986; 1994) categorisation of reporting "political" controversies – consensus; legitimate controversy; and deviance – to show how the notion of objective reporting can be influenced by certain circumstances in this example of reporting a science education controversy (see Chapter 2, Section 2.3.4. and Chapter 3, Section 3.3.3.).

The notion of balance in reporting the controversy around teaching the theory of evolution and creationism is invoked by all of the educational correspondents in the sample, as well as by the foreign correspondent and the freelancer, but not by the science editor. For instance, the following is the reply to a question if this educational correspondent thought the mistrust in authorities could be an important element in the story around Emmanuel College:

> "I'm sure they [concerned parents] felt that they [concerned parents] had perhaps turned their backs for five minutes and their children were being taught that God created the world. But whether He [God] did or not is not really for me to comment because my job was just to present the story really in as balanced a way as I could."
>
> (Educational correspondent, 19 October 2005)

This educational correspondent, in the same manner as the other educational correspondents, the foreign correspondent and the freelancer, did not see commenting on who or what is right or wrong as the job of journalist in reporting this controversy. Hence, professional norms overrode the personal opinions of these media professionals. They saw the task of the professional journalist to give a balanced account of the different views concerning the debate.

In the case of Emmanuel College this meant that voices that attacked the teaching practice at the school needed to be countered by views that defended the school, for instance by the staff of the school or its sponsor to provide a spectrum of opinions. In this view the educators and backers of Emmanuel College clearly had a right to be heard and the journalistic norm of objectivity and balance applied to this case. Also, when the foreign correspondent wrote about the theory of Intelligent Design (see Chapter 1) then proponents of this challenged theory needed to be countered with other experts that attacked the validity of the theory, but both deserved to be represented in a balanced account of the issue.

This analysis suggests that news reporting in this instance is taking place in Hallin's (1986, 1994) conceptual space of a legitimate controversy: voices backing and attacking Emmanuel College and the teaching of creationism deserve to be heard in order to give a balanced – and therefore according to the norms of journalistic practice "objective" – account of the story.

The consequence of balanced accounts is that contradictory views of a spectrum of opinions will be opposed to each other. For instance, the interviewed freelancer explained that after being briefed on a story the freelancer is going to look for "the most extreme positions" around which the freelancer is going to construct the story the freelancer is going to write. This can lead to reconciliatory or less radical and intermediate positions residing in between the two extreme ends of opinion being neglected in the public representation of the issue. Journalists may also actively seek counter-positions of

"maverick" experts to challenge a given (scientific) consensus (see Dearing, 1995; Boyce, 2006).

Consequently, what appears in the coverage is then a story of conflict between two opposing camps, in this case of two groups either backing or attacking the school and its teaching practice. One of the educational correspondents confirmed that this picture can result as a consequence of balanced reporting, when asked why the intermediate positions received less attention in the press coverage than strong views at the ends of the spectrum of opinion:

> "That may just be down to the fact that that's one of the natural, unfortunate results of journalism is that articles will tend to... It comes across very strongly with articles on Islam and terrorism, will be all about one issue, and then to counteract that, there'll be the opposing opposite view at the bottom. So the views of the middle ground often get missed out."
>
> (Educational correspondent, 14 October 2005)

This practice might explain why the two opposing groups either backing or attacking Emmanuel College for various reasons received substantially more coverage than a group of experts arguing for an intermediate reconciliatory position, that was hardly reported at all (Chapter 4, Section 4.4.). So far there had been agreement amongst all interviewed correspondents that the debate around Emmanuel College and around teaching creationism and the theory of evolution needed to be reported according to the notion of objectivity that involves a balanced account of the issues at stake. This happened in most of the news reports included in the sample and might also offer an explanation why there were almost as many scientific experts quoted as education experts (Chapter 4, Section 4.3.1). Almost all of the quoted scientific experts were against teaching creationism in science classes – these views have often been countered with the views of either educators of Emmanuel

College or representatives of the foundation that sponsors Emmanuel College (see the analysis in Chapter 4, Section 4.3.).

However, the interviewed science editor is the only one who had a very different view on this issue. This was the statement when the science editor was asked how the story was approached:

"I approached it completely cynically and against creationism. I'm the science editor so what do you expect? So I wasn't going to go in there particularly with a very fair and open mind but I can't remember the story I wrote. But I was writing from a very one-sided perspective in this case, not something that should be encouraged and should be as fair as possible. But sometimes bugger it. Life's too short and if people are being stupid you've got to say."

(Science editor, 13 October 2005)

In a previous statement the science editor already stated that the science editor did not recognise what this interviewee called "this so-called debate" as a controversy at all and in this quote as well as in the previous quote (see 5.2.3.) the science editor pointed to the position as editor for science news as one reason why the story was approached one-sidedly against creationism.

This suggests that the science editor did not see this debate taking place in Hallins (1986, 1994) conceptual space of a legitimate controversy but in the sphere of deviance. The journalistic norm of objectivity that involves a balanced account therefore did not apply for the science editor in this case. The science editor supported and represented the mainstream opinion in the scientific community that the theory of evolution is a valid and reliable account. Hence, creationism should not be considered as science and not be taught in science classes.

In the science editor's view experts advocating creationism as a scientific theory that should be included in science education deserved no representation in news accounts, or if they did then only to be countered by overwhelming evidence from the scientific

consensus viewpoint. The way the science editor reported this issue therefore effectively reinforced the consensus view of the scientific community.

A look at articles written by the science editor about the controversy confirms this view (see 5.2.4.). Furthermore, the science editor's argumentation concerning the view on creationism was very close to the rhetorical strategies of the scientists (4.3.2.) in saying that the science editor did not see any evidence neither for creationist ideas being valid nor for the existence of a God. (Earlier in the interview the science editor also said that this interviewee took a science degree as explanation for how the science editor got into science reporting. It can therefore be assumed that the science editor has, to a certain degree, been enculturated into the scientific community.)

In this regard it is noteworthy that there were two cases in the sample where the credibility of scientific expert sources who attacked the credibility and validity of the theory of evolution were challenged, either in the way the scientific expert was represented, or the way their quote was decontextualized (see Chapter 4, Section 4.3.3.b.). Both of these articles were written by science correspondents or editors (Burkeman and Jha, 2003, April 10; Connor, 2003, September 4). In framing these two scientific experts in this way the reports helped to reinforce the credibility of the consensus view of the scientific community.

It is noted particularly in the literature on science journalism that science correspondents occasionally show signs of deference towards science and scientists and therefore might often be too close to the scientific establishment to produce critical accounts (e.g. Goodell, 1987; 1989; Dornan, 1990; Nelkin, 1995; Holliman, 2000; 2007). Science correspondents might not want to be too critical about what is happening in the scientific world since they are still dependent on scientists as their expert sources (Hansen, 1994; Conrad, 1999). This is a negative consequence of the symbiosis between specialist correspondent and expert source. Nelkin (1995) for one criticizes the lack of political perspective of science journalists and correspondents and suggests that science correspondents would hardly ever

dare to criticize the consensus view of the scientific community because otherwise it might be difficult in the future to keep in touch with scientific experts. This would affect how science correspondents write about scientists:

"Captivated by science and regarding scientists with awe, most science journalists write about their subject in much the same glowing terms that sports reporters use for prominent sports stars." (Nelkin, 1995: 98)

In this instance the statements of the science editor might be interpreted as contradicting the conclusion of Hansen (1994) that science journalists see themselves as journalists first and as special correspondents second. The evidence suggests that in this case the science editor personally felt so strongly about this issue that they abandoned the journalistic ideal of balanced reporting in the story about teaching creationism and the theory of evolution and instead adopted the consensus viewpoint of the scientific community. In this regard it should be mentioned that Mooney and Nisbet (2005) and Rosenhouse and Branch (2006), arguing from a position that is defending the scientific consensus on the theory of evolution, conclude that one of the problems with creationism (or Intelligent Design mainly in the US context) in the media is that it is often other correspondents than science correspondents that cover the debate between creationists and scientists attacking creationism. In their views, correspondents with deficient knowledge in science help to promote creationism by balancing creationist's accounts with those of scientists. In contrast science correspondents would generally not accept creationist expert sources and arguments being equal to the scientific experts and arguments. However, it is also important to note that it is probable that the science editor would normally not adopt such an attitude when reporting other stories.

Hallin's (1986; 1994) model of objective reporting in the context of political controversy helps to illuminate and address the issue of when and how objective and balanced reporting is possible. However, there is a general shortcoming in this model. Hallin's model seems to

act on the assumption that a political controversy (in his case about the Vietnam War) is a single one. The analysis in Chapter 4, Section 4.2. showed that in the case of this study multiple controversies are hidden in what appeared to be one single controversy from the outside. It is not rare that public controversies about science and technology consist of several controversial issues and involve various actors and experts that are debating about different issues (Chapter 2, Section 2.1.2). In this case it is possible that the specialist correspondents were reporting different aspects of the various controversial issues which may have been in different spheres according to Hallin's model.

The educational correspondents saw the debate around Emmanuel College as a legitimate educational controversy that involved quoting experts from opposing sides. However, the science correspondent approached the debate from a scientific angle and saw religiously motivated approaches of challenging the scientific status of the theory of evolution as illegitimate and intolerable attacks on the consensual scientific view on the origins of life.

Therefore there might be the problem that Hallin's (1986; 1996) model is not taking account of multiple lines of controversy. Hence, the science editor could actually be judging a different strand of controversy to be illegitimate when compared to the educational correspondents. Hallin's model should therefore be used with caution in analysing complex controversies with various controversial issues.

The evidence collected suggests that the different "desks" and specialist correspondents that can be assigned to the same story could have different views on the legitimacy of a public debate and other issues and the consequential application of journalistic norms of objectivity also how this is enacted in the representation of expertise. However, the same story can be covered by several desks. Hence, a newspaper may provide conflicting accounts on the same issue (Eldridge, 1993; Holliman, 2000).

Whether journalistic accounts are written according to the norm of balanced reporting can also have a direct influence on which individual experts and which types of experts are going to be represented and for which experts access to the media is denied. In this

instance, the notion of objectivity among media professionals therefore seems to be flexible and can mean different things across the various journalistic specialisms. The specialism of correspondents can therefore influence the general journalistic conventions and practices.

## *5.3. Promotional strategies*

An important issue in the representation of experts is the question of access to the media and also the use of promotional strategies (e.g. Gandy, 1982). For instance, McNair (2004) and Schudson (2003) argue that in order to understand the content of news media it is also important to have a look at how (expert) sources are trying to influence and use the news media. Experts and institutions can, for instance, employ professional public relation specialists (e.g. Davis, 2000; Miller, 2002).

This section examines if expert sources employed particular strategies of managing access to newspapers or influencing their presentation in the newspapers in the story about teaching creationism and theory of evolution. It is also interested in the question of whether the self-presentation of experts using the internet could have had an influence on media reporting and how the internet and other communication technology is used by media professionals as a resource.

All of the interviewed media professionals mentioned the important role of emailing, the internet and online databases in researching the background of issues they are writing about and investigating about relevant actors, for instance:

"[...] I don't know if you've checked their [Emmanuel College's] website but I can remember that a couple of colleagues of mine did actually get some information from their own website because I think they have details about their curriculum on their website.

[...] I think it [the internet] is generally becoming more of a tool for journalists these days. Although I sometimes think they get too much from the Internet and sometimes it can encourage people to be a bit lazy.

And you need to be very careful about where you're taking your information from because anybody can set up a webpage.

[...] There are always web pages surrounding the Department for Education and Skills. If you're looking for certain information on the City Academies, for example, I would be able to get some information from there. And of course that would be reliable because it would be from the Government's own web pages."

(Educational Correspondent, 19 October)

It also emerged in the interviews that if institutions, organisations or companies that play a role in a current issue have a website with contact details of a spokesperson or press officer this is very useful resource for the journalist[37].

Most of the interviewed media professionals stressed that it is important for them to get hold of interviewees very fast. The main technical tools of contacting experts are the (mobile) telephone, fax and email. However, one of the education correspondents stressed that if a story has just broken the internet generally was not of much use. Experts that this correspondent thought were relevant and knowledgeable about the fresh story still needed to be contacted directly to verify the new story.

The use of the internet is not only relevant for proactive newsgathering but it might also encourage reactive uses of promotional material or website. For instance, in various cases journalists quoted directly from the website or the prospectus of Emmanuel College (e.g. in Bunyan and Bonthrone, 2002, March 15), websites of creationist organisations (e.g. in Branigan, 2002, March 25) and the websites of other institutions and organisations instead of tracing the relevant experts and talking to them themselves. In doing so they were able to provide an "accurate" voice without even leaving the office. This is part of an increasing trend in newsrooms; working mainly from the office (Holliman, 2000).

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[37] For instance, the National Union of Teachers has the phone and fax number for different regions on their website: http://www.teachers.org.uk/story.php?id=3613 and the British Humanist Association offers experts for comment as service for journalists on their website: http://www.humanism.org.uk/site/cms/contentChapterView.asp?chapter=342 (both websites checked 16 August 2007).

However, as mentioned earlier (see 5.2.4.) at least three of the educational correspondents visited Emmanuel College and interviewed its educators. Also the foreign affairs correspondent and the freelancer phoned up experts and visited them at their workplaces when they researched their stories.

As mentioned in the statement above different homepages also have different degrees of credibility and some websites are seen as being more credible than others. For instance, several educational correspondents stated that the homepages of the (then) Department for Education and Skills provided factually reliable and trustworthy accounts. Other websites that were mentioned as being a good source for education correspondents were, for instance, the websites of the BBC and the education pages of *Guardian Unlimited.*

The use of these websites also point to the self-referential nature of media reporting (Luhmann, 2000) and the possibility that media professionals are influenced by previous media reporting about an issue (Kitzinger, 2000). This is also relevant when the journalists said they used press clippings and their own media archives for their background research (see also Attfield and Dowell, 2003).

The issue of getting hold of expert sources who are able to provide a direct, authentic and valid account of what is happening at a school was particularly important for the educational correspondents (see 5.2.4.).

Three educational correspondents also asserted that the easier the access to a controversial school is and the more willing the educators are to cooperate with the journalists the more likely it will be that the school receives favourable coverage. Here is an example about the once newsworthy Ridings School in Halifax, mentioned by one of the educational correspondents:

"On the whole, it's usually in their [schools] interests to be as available and to make comments... it's usually better for them than to try and sort of not answer, because the story won't go away. If it's an important story, it won't go away, so on the whole it's better [...] Have you heard of the Ridings School? Some years ago

now, but there was an interesting case study in this respect inasmuch as initially it tried to close down and refuse any sort of access to the school, and what it ended up with therefore was photographers, reporters, sort of camped on the street outside, and that didn't really do it any favours because it made it look as if it had something to hide and it got pictures of kids acting up a little bit outside, whereas as soon as they got a sort of interim head teacher appointed, one of the first things he did was to lay on the facility and to open up the school to let people in. And I think it immediately started to get better coverage, because these stories are always more complex than they seem. And unless you put your side of it, it's not going to be heard."

(Educational Correspondent, 1 February 2006)

This statement stresses that expert sources and institutions involved in controversies benefit from access to the media because then they can make their voice and view heard. It also suggests that one cannot easily avoid the media if it is a big story. Schools and other institutions also might not want to be represented in a controversial story (e.g. Baker, 2000). However, in this particular instance the statement seems to suggest that expert sources will benefit from allowing media professionals access to particular institutions. In this way sources do not only struggle to get access to the media but sometimes media professionals also have difficulty in getting access to particular experts and institutions. This was mentioned by educational correspondents before (5.2.4.). However, this statement also mentioned the complexity of educational issues in the media and this journalist underlined the fact that there are mostly several sides and factors involved in reporting educational stories. This educational correspondent also noted that it was not unusual to receive promotional material (for instance when a schools opens a new science block) when one is covering education stories but the correspondent considered that material sent out by public relation experts was rarely news and should therefore not be covered by journalists.

Furthermore, all of the interviewed educational correspondents noted that they also approached Emmanuel College and the openness of the school towards journalists is a reoccurring theme in the interviews. They stressed that it was very easy to get access to the

school and that representatives of the school were very willing to talk to journalists, for instance:

"They [Emmanuel College] were very willing. I think they deserve a lot of credit for that. They've been extremely open, and they've been very willing when we and other newspapers have written articles, to say, well come in and take a look, find out what it's really like. And certainly when I went round; I went round once with another journalist with The Independent as well, and then I've been to the King's Academy twice."
(Educational correspondent, 14 October 2005)

Other statements also stressed that schools sponsored by Peter Vardy were always willing to talk to journalists, also in other stories about the school. One of the educational correspondents mentioned that it is very helpful in dealing with journalists to be reliable, available over phone and willing to comment. This mirrors some of the Conrad's (1999) characteristics of a "good source" (Chapter 2; Section 2.3.3.).

Also Peter Vardy's Foundation was an important organisation in the newspaper coverage and contacted by several of the interviewed journalists. Also in their case none of the journalists had difficulty to get information from them, for instance:

"By the time the story hit they [the Vardy Foundation] had their press box and were pretty well briefed. I think whenever they've been asked for comment they've always been quite open and willing to comment. I think that's probably the best way to just be upfront. And they've dealt with an awful lot of controversy as a result of these stories over the years so I think they're quite used to the media."
(Educational correspondent, 19 October 2005)

The fact that the school was willing and prepared to deal with the journalists and that the Vardy Foundation had press officers who dealt with the issue suggests that the school and the Vardy Foundation were aware of media reporting and the possibility of influencing their representation by putting their view to the story. They also had the means and experience of dealing with the inquiries of the journalists. According to one of the educational correspondents, this is not a regular standard for schools and might be the

consequence of previous experiences with the media. The Vardy Foundation hired public relation professionals to manage the public representation of the controversy and could draw on resources, professional experience and strategies to deal with media.

The same is true for many of the other experts that were quoted more often in the newspaper sample. For instance, it emerged in the interviews that also teacher unions, the (then) Department for Education and Skills and secular/humanist groups used the services of professional communication experts and/or had press offices or officers. The evidence presented suggests that at least several of the quoted expert sources knew about the importance of making themselves heard in the media and of putting their view to a story and that promotional strategies (such as the use of public relation experts) were employed in the debate around Emmanuel College.

Established and possibly regular contact to the media potentially gave some of the expert sources a strategic advantage in comparison to other experts that had less contacts and experience with the media and resources to draw on and/or did not employ the services of professional PR experts to make their voices heard (see also Miller, 1999).

The concentration of different types of expertise and established contacts to the media in the various action groups could also be interpreted as a particular strategy to receive media attention and to enhance credibility through the display of consensus among experts from various fields (Chapter 4, Section 4.4.). Here it might also be that a common call for action from a diverse set of people, exemplified in a vocal atheist voice teaming up with high-profile churchmen, is expected to have news value for media professionals. One interviewee said that petitions from action groups are generally forwarded to newsrooms. These tactics represent not only a struggle for access to the media and visibility but can also be seen as part of the struggle for credibility and a positive image which can be enhanced through media exposure (Chapter 2, Section 2.1.1.)

Small groups of experts, such as the Association of Christian Teachers (see Chapter 4, Section 4.4.3.) or individuals that were not organised such as, for instance, the pupils of

Emmanuel College received less coverage and were quoted less often (Chapter 4, Section 4.3.7.). It is possible that they did not have similar means, resources and experience and therefore might have found their voices represented less often in the newspaper coverage than other experts. Since they do not have professional, specially trained spokespeople and established connections to the media, journalists wanting to quote a parent or pupil have to make an effort to interview them requiring additional resources to do so (5.2.4.).

Expert sources that are able to employ promotional strategies and can draw on various resources, established contacts and professional help have a better (but far from guaranteed) chance of making their voices heard and influence their representation in coverage of the debate. Furthermore, the use of electronic communication and the internet are widespread in the professional practice of journalists and can also lead to shifts from proactive to reactive reporting or the reactive use of promotional materials available through the internet (for discussion see Allan, 2006 and Holliman, 2007). Extending Gandy's (1982) initial definition (Chapter 2, Section 2.3.5.) web pages and online databases could in this sense also be regarded as a from of information subsidy. However, evidence was presented in this and the previous sections that proactive contacting and interviewing of expert sources and news reporting on behalf of educational and other correspondents did take place in the coverage of the story about Emmanuel College.

## *5.4. Conclusions*

This chapter has presented the findings of an analysis of media production through semi-structured interviews with media professionals and compared the findings with results of previous analyses of media content. These findings showed that the debate around teaching creationism and the theory of evolution was covered in news reports written by various general reporters and a range of specialist correspondents, but, when stated, primarily by education and science correspondents (5.1.).

The analysis of the interviews showed that various lines of controversy were newsworthy but from the point of view of the educational journalists the new school type of Emmanuel College being a state school funded additionally by a private sponsor was one of the most important aspects of the story and these types of schools had already been controversial before the debate (5.2.3.). However, the interviewed media professionals assessed the news value(s) of the story in different ways and gave different answers about what made the story newsworthy to them (5.2.2). The variety of news values that were identified could also have been a factor in the sustained coverage of the debate and the amount of newspaper articles that the story around Emmanuel College generated. It is also likely that there is a connection between the news values ascribed to the story, the different lines of controversy and the expert sources selected by the media professionals.

The different specialist correspondents that wrote news reports about the debate selected different types of expert sources for use in their reports (5.2.4.). The science correspondents relied primarily on the expertise of scientists (Table 5.2.). This reliance of science correspondents on scientists as expert sources was also documented in other studies (e.g. Shepherd, 1981; Goodell, 1987; 1989; Dornan, 1990; Hansen, 1994; Nelkin, 1999; Conrad, 1999; Holliman, 2000; 2004). The expert sources selected and quoted by educational correspondents were more diverse and of a broader range (Table 5.2.). This also allowed for a greater variety of the ways how news reports could be approached and framed and what issues were addressed in the news reports.

The analysis further showed that the interviewed media professionals had different criteria for the selection of expert sources (5.2.4.). Personal acquaintance and trust were important factors in the established relationships between special correspondents and their experts and have been mentioned by educational correspondents as well as by the science editor. The science editor, for instance, had a list of established and trusted expert sources that were accessed regularly if expert opinions were needed. Experts that have regular access to journalists have a strategic advantage in being represented as credible and authoritative.

The importance of social capital (Bourdieu, 1986) of expert sources in accessing the media regularly has also been documented in the literature (e.g. Detjen, 1995; Hansen, 1994; Nelkin, 1995) Other experts that do not have the advantage of established relationships with special correspondents will find it more difficult to get access to the media and be represented as credible expert voices.

However, apart from social capital the expert sources also need the relevant cultural capital (Bourdieu, 1986) in order to speak with authority on a specialized subject. Science correspondents consider the academic reputation, the standing among their peers and the specialist knowledge of the (scientific) expert as being crucial prerequisites of expert sources (see also Hansen, 1994; Nelkin, 1995; Conrad, 1999).

Educational correspondents also acknowledged the cultural capital (Bourdieu, 1986) of expert sources but they had extended criteria for expert credibility. For them expert source relevance also meant that the expert source had to be as close as possible to the specific event or institution they were writing about. Validity, authenticity and the directness of the expert account was as important as the specialist expertise of the expert source. Education professionals such as head teachers or representatives of teaching unions were seen as credible expert sources for their professional experience and knowledge. Furthermore, the education correspondents stressed that they generally tried to represent a voice of the teaching profession, the government's view on an issue and if possible the view of pupils, parents and other local actors.

The case of an educational correspondent writing for a regional/local newspaper suggested that the type of newspaper the journalist is working for can have an influence on professional practices. In the statements of this correspondent it was particularly the responsibility of being part of a local community that suggested that the voices of ordinary members of the community needed to be represented in the coverage. This affirms the observations of Aldridge (2007) who observed in a study about journalists working for regional/local newspapers that

"[...] this sense of being part of a community, of having direct contact with readers and the potential to 'make a difference', is still a powerful source of satisfaction for at least some of those who stay in, rather than pass through local media." (Aldridge, 2007: 142)

However, Aldridge (2007) argues that the direct contact with readers is a source of pride to journalists but the sense of responsibility to which many media professionals working for regional/local media refer has a moral as well as a commercial basis.

Another important factor in the production of news reports was the professional experience of the journalist or special correspondent who was producing the newspaper account. This professional experience also implied the knowledge about contacting, knowing and keeping in touch with experts and which the right expert sources were to talk to (5.2.1. and 5.2.5.) and also how to elicit quotes and use them effectively (5.2.6.).

These results indicate that the specific "desk" that was assigned to cover the story about the controversy had a direct influence on which experts were selected, how they were represented and also which issues could be addressed in news accounts (5.2.5.). This is particularly relevant for stories about science education, which can be covered by science correspondents, educational correspondents, general news and political correspondents and other journalists.

Another finding is that the notion about what the journalistic norms of objective reporting and balancing accounts meant varied between the science correspondent and the educational correspondents. This had consequences for the question which kinds of expert sources needed to be represented in the news reports (5.2.7.). Using Hallin's (1986; 1994) categorisation the science editor did not view the controversy around teaching creationism and the theory of evolution as a legitimate controversy. This correspondent argued that the

journalistic norm of balance did not need to be applied in this regard in this particular story (but it is likely that the norm of balanced reporting is the default position in other accounts of this correspondent).

In contrast, all the educational correspondents (and in this regard also the remaining journalists) interviewed in this study agreed that the debate was a legitimate controversy and that the journalistic norm of balance as a way of representing objectivity had to be applied. In their view, advocates of teaching creationism should be represented as relevant expert sources in order to counter the views of the expert sources that oppose this approach, otherwise the reporting would not be balanced and therefore objective. The different notions of journalistic objectivity therefore determined what kinds of experts will be represented and which will be denied access to the media.

Hallin's (1986: 1994) model of news reporting in (political) controversy contexts is based on a somewhat simplified understanding of controversy that does not acknowledge multiple lines of controversy. It should therefore be applied with caution in complex controversy contexts and it is possible that the science editor and the educational correspondents were judging different strands of the debate. However, links between science correspondents not balancing accounts of scientists and creationists and other general and specialist correspondents balancing them have also been noted in other studies (Taylor and Condit, 1998; Mooney and Nisbet, 2005; Rosenhouse and Brand, 2006). Whether accounts are balanced or not can therefore be connected to the type of correspondent covering the story and also have effects on what types of expert sources are represented and which are not. Furthermore, the journalistic norm of balance can also have an effect on how stories are framed. For instance, Schudson (2003) finds:

> "News tends to emphasize conflict, dissension, and battle; out of a journalistic convention that there are two sides to any story, news heightens the appearance of conflict even in instances of relative calm."
>
> (Schudson, 2003: 50)

Some statements of the interviewed media professionals (5.2.7.) confirmed this view and stated that a consequence of balanced reporting is that often only the opposing extreme positions at the ends of a spectrum of opinions will be presented. The journalistic practice of balancing accounts can therefore explain why the intermediate group of expert sources arguing for a reconciliatory position between religious and scientific accounts received least coverage in the sample (Chapter 4, Section 4.4.). However, some journalists may also select "maverick" expert sources that oppose the (scientific) consensus in order to fuel controversy and construct an interesting story (e.g. Dearden, 1995; Boyce, 2006).

The analysis in section 5.3. suggests that various of the quoted expert sources were aware of the importance of promoting their presentation in the newspaper accounts and employed promotional strategies in order to make their view heard. However, there were also various expert sources, groups and other individuals who did probably not have the means to employ promotional strategies but still wanted to make themselves heard. Perhaps one of the only possibilities they saw in order to participate in the debate and making their view represented was through the use of the internet and in writing letters to the editors. This would partly explain the comparatively high amount of letters published in the sample (Chapter 4, Section 4.1.4.).

The evidence presented in this chapter provides further perspectives that usefully inform the study of newspaper content about the selection and representation of expert sources and help to get a better understanding of how newspaper content is produced. The results suggest that various specialist correspondents had covered the controversy around teaching creationism and the theory of evolution in different ways. Specialist correspondents with different specialisms had different criteria for the selection of expert sources that can explain why they represented different kinds of experts (see Chapter 4, Section 4.3.) and had different notions of the legitimacy of the representation of various expert sources, that might explain why some specialist science correspondents challenged the credibility of

expert source arguing against the validity of the theory of evolution in their newspapers accounts (particularly in Chapter 4, Section 4.3.2.b.). In doing so, and also by not balancing the accounts of pro-creation experts with pro-evolution scientific experts science correspondents effectively supported the boundary work (Gieryn, 1983; 1995; 1999) of science and help to promote the scientific consensus view on the theory of evolution as the credible, authoritative and trustworthy account of specialised and professional scientific experts.

These findings illuminate some of the results of Chapter 4 about expert source selection and credibility of expert sources but they cannot explain all the differences, since many of the articles in the sample were written by other media professionals that possibly used different criteria for the selection of expert sources and the relevance of experts in their stories.

The dataset presented in this chapter is limited and it would require more interviews with specialised correspondents and general news reporters to gain a fuller picture of the similarities and differences in journalistic practices. Here it would be interesting to see whether there are consistent patterns of statements about expert source selection and journalistic practice among specialist correspondents such as science correspondents and educational correspondents and whether and how they differ from each other and those of general news reporter in the production of stories about science education. It would also be desirable to find out more about the selection processes of how a particular desk comes to cover a particular story and also who it is that decides which desk is assigned to which story.

However, the analysis presented in this chapter has provided some insights into the professional practice of specialist correspondents reporting a single story about science education. These snapshots addressed relevant areas of professional journalistic practice and media production of a story about science education and helped to illuminate and supplement the results of the content analysis.

# 6. Conclusions

This thesis examined representations of science education in the UK press through a single case study: the debate that revolved around Emmanuel College teaching creationism in science classes. It was shown that this debate was not a single controversy but consisted of various controversial issues. This case study focused on the role of expert sources, what they had to say, how they were described and if connections between quoted experts could be found in the coverage. The question of how journalistic practice influenced media production processes and if there were differences depending on journalistic specialisms was considered. In order to investigate these questions empirically a qualitative and quantitative approach to analysing newspaper coverage was combined with semi-structured interviews with media professionals. This approach allowed the comparing and contrasting of results from each analysis. Analysing both elements in relation to each other produces additional insights that cannot be gained from an analysis of only one of these elements. The strengths and weakness of this approach are discussed in the following sections.

The first chapter introduced the relevant background of the study: it introduced the case study; an overview on the issue of science, religion and creationism; origin and status of the theory of evolution and the situation of teaching creationism in the United Kingdom. It also introduced the research questions that are answered in this concluding chapter. Chapter 2 introduced the relevant theoretical background from the literature on social theory, science and technology studies, science education and the sociology of journalism and the media. Chapter 3 explained the methodology and the methods used in this study in detail. Chapter 4 presented the results of the quantitative and qualitative analysis of media content and Chapter 5 described the results of the analysis of media production processes gained through interviews with media professionals.

This chapter answers the research question, and reflects on the outcomes of the thesis, discusses strengths and weaknesses of the overall approach and suggests further work that could build on the results of this study. It will close with an outlook on recent developments.

## *6.1. Findings*

This section is going to present the findings in relation to the 13 research questions there were introduced in the first chapter (Section 1.5.), and considers the implications thereof.

1. When and where were articles concerning the controversy around teaching the theory of evolution and creationism in science classrooms published?

In order to analyse newspaper coverage of science education it was important to find out when and where articles concerning the case study were published. A quantitative approach to analysing media content was used to determine the distribution of articles from 1 January 2002 until 20 February 2004. A sample of 20 UK newspapers (national, regional/local and specialist newspapers) was drawn using the online database LexisNexis (Chapter 3; Section 3.2.2.).

287 newspaper articles were published in the newspapers included in the sample relating to the controversy around teaching creationism and evolution from 1 January 2002 to 20 February 2004 (Chapter 4, Figure 4.1.). The results suggest that the controversy about creationism and the theory of evolution at Emmanuel College remained newsworthy to some extent throughout this period (and beyond). However, most of the articles were published between 9 March 2002 when it was reported in *The Guardian* that creationism was taught in science classes at Emmanuel College and 22 May 2002 when OFSTED announced that it was not going to re-inspect the college, after calls for re-inspections of

the school were made. After this period fewer articles were published but the issue never disappeared completely from newspaper coverage (Chapter 4, Sections 4.1.1. – 4.1.2.). This distribution of articles in the sample was not unusual when compared to other studies of science news events (e.g. Holliman, 2000; 2004; Cassidy, 2005).

The teaching of creationism in science classes at Emmanuel College was first mentioned in a brief news report in the *Times Educational Supplement* in January 2002 (Dean, 2002, January 25), then taken up again by *The Guardian* (Branigan, 2002, March 9) in March 2002. Other publications followed the initial reporting of the controversy in *The Guardian* especially after the Prime Minister was confronted with this issue in Parliament by Lib Dem MP Jenny Tonge. Compared to other studies it is not unusual that debates become politicised and receive additional coverage after high-profile politicians got involved (e.g. see Nerlich and Clarke, 2003; Holliman, 2004).

The debate was mainly reported by elite newspapers, but also by specialist publications on education (the *Times Educational Supplement* and the *Times Higher Education Supplement*) and two regional/local newspapers that were located near Emmanuel College (*The Northern Echo* and *The Journal*). The debate around Emmanuel College was hardly an issue for mid-market and popular newspapers which had altogether only seven articles on the debate. This result suggests that the newsrooms of the different newspapers involved judged the news value of the story differently. This result corresponds with Ellegård's (1990) study about the reception of Darwin's theory of evolution in the British periodical press from 1859 to 1872 (Chapter 4, Section 4.1.3.).

In summary, the distribution of articles in the debate around Emmanuel College teaching creationism in science classes is not unusual compared to other studies that investigated controversies in the media.

2. What types of articles were published concerning the controversy around teaching the theory of evolution and creationism?

In order to say more about the coverage of the debate around Emmanuel College it was necessary to find out what kind of articles reported the debate, for example whether an issue is treated only in opinion and comment pieces or mainly in news reports (e.g. Steward et al., 2001; Richardson, 2007). Different types of articles allow for different ways of approaching events and current issues. For instance, editorials will almost certainly show the opinion of a media professional, whereas news reports are articles that are supposed to report events without the expression of opinion. However, journalists can use expert sources to express their own opinion (e.g. Tuchman, 1972; Steward et al., 2001; Richardson, 2007).

A quantitative approach of analysing media content was used by setting up five categories of types of articles (news reports; comments; letters; book reviews; other articles) in order to determine the distribution of types of articles (Chapter 3; Section 3.2.4.c).

Most of the 287 articles in the controversy were news reports (111 reports – 39 %) and letters (90 letters – 31 %) (see Chapter 4, Section 4.1.4. and Figure 4.2.). 59 (21 %) of the articles were comments and opinion pieces. This finding relates to discussions in the literature whether comment and opinion is replacing fact-based news reporting (e.g. Steele et al., 1996: Rosen, 2001; Weaver, 2001; Schudson, 2003; Bolz, 2006). It is cheaper and quicker for media professionals to write comments on events instead of spending time and further resources on investigating further developments or finding and interviewing relevant expert sources. However, comments and opinion pieces can also be used by expert sources to express their views (if they have access to the media). For instance, the scientific experts Richard Dawkins (2002, March 9; 2002, March 18) and Steve Jones (2002, March 20) but also other expert sources (e.g. Smithers, March 28) publicised their opinion in comment articles which appeared in the sample period. This means that

expertise can not only be found in quotations from experts sources in news reports but also in opinion pieces.

The debate was also mentioned in 12 book reviews (4 %) and 15 articles (5 %) that fell in none of the other categories also referred to the controversy (Chapter 4, Section 4.1.4).

The number of letters seems to be unusually high compared to other studies investigating socio-scientific controversies in the media (e.g. Clayton et al., 1993; Holliman, 2000; Cassidy, 2005). However, a study on the creationism and evolution controversy in US newspapers (Martin, et al. 2006) also found that a high number of letters had been published there. The high number of letters indicates that many of the readers of the newspapers included in the sample (most letters were published in *The Independent* (20 letters), *The Times* (14 letters) and *The Guardian* (14 letters)) felt inclined to comment on the issue and send a letter to the editors. Not all letters by readers will be published, editors and sub-editors must select which letters are published in the newspapers (Wahl-Jorgensen, 2002; Raeymaeckers, 2005; Richardson, 2007). It is therefore possible that more letters were written and sent than were actually published in the sample. However, it is also possible that people that had no other option of accessing the media used letters as a feedback opportunity (see Raeymaeckers, 2005) to make their voice heard. Nonetheless, some of the expert sources that were quoted in news reports had letters published in the sample (e.g. Dawkins, 2002, March 23; McIntosh, 2002, March 16). Here it would be interesting to examine the letters in more detail, for instance whether how expertise was used or displayed in the letters and what the different argumentation lines in the published letters in the sample were. Letters were excluded from the further analysis of the representation of experts and expertise since they are units of analysis that differ from other types of articles since they are the only ones that represent the opinions of readers. The research presented in this thesis was designed to find out how media professionals represent and select expert sources this is why letters were excluded from the analysis.

3. Was the debate around Emmanuel College a single controversy or were there various controversial issues involved in the debate? If so, what were the issues of the controversy in articles included in the sample?

Public controversies around science and technology often involve various elements and controversial issues (Chapter 2; Section 2.1.2.). Engelhardt and Caplan (1987) therefore recommend to establish "geographies of controversies" in order to distinguish the various contentious issues that are involved in public controversies about science and technology. This approach was adopted firstly to find out what the controversial issues were in the debate around Emmanuel College (Chapter 4, Section 4.2.) and secondly to be able to relate the statements of quoted expert sources back to the various controversial issues involved in the debate (Chapter 4, Section 4.3.). A qualitative approach of analysing media content was adopted to categorise the various controversial issues in the debate around Emmanuel College that were reported in the newspaper sample (Chapter 3, Section 3.2.5.a.).

The results of this analysis show that the debate around Emmanuel College was not a single controversy but consisted of various controversial issues (Chapter 4, Section 4.2.). One important issue in articles about Emmanuel College was that it was claimed that the school was teaching creationism and contesting the theory of evolution in science classes. The information about where and how precisely creationism was taught at the school (e.g. in science classes, religious education or both) was somewhat confused in the coverage. However, it was consistently claimed that educators at the school were undermining the teaching of evolution. Debates about this issue also related to the requirements of the National Curriculum for Science (the teaching of the theory of evolution and fossil evidence for the theory is mandatory but the National Curriculum does not prohibit mentioning "alternative" explanations in science classrooms). Also the idea whether or not it is helpful to teach controversy per se in science education and a paragraph in the

National Curriculum for Science that mentioned Darwin's theory of evolution as an example of how scientific controversies can arise from different ways of interpreting empirical evidence were controversial aspects concerning this issue (Chapter 4, Section 4.2.1.).

Another important controversial issue of the debate was the nature of the school. Emmanuel College is a City Technology College, a school that was partly funded by a private sponsor but that also received state funding. City Technology Colleges were controversial before the story of Emmanuel College teaching creationism in science classes and journalists could build on a previous controversy and also previous news coverage. It was claimed by various quoted expert sources that the foundation of the religious sponsor Sir Peter Vardy used its financial influence to introduce creationism in science classes. Peter Vardy and Emmanuel College consistently denied these allegations and referred to the requirements of the National Curriculum being met at the school (Chapter 4, Section 4.2.2.).

Furthermore, Emmanuel College was a school that consistently received excellent examination results and received an "outstanding" report by an OFSTED inspection team. The Prime Minister and others backed the school for the very good results it achieved. However, various critics attacked the positive report the college had received and challenged the credibility of the OFSTED inspectors that wrote the report (Chapter 4, Section 4.2.3.). This issue can be considered as a short self-contained controversy that started with the calls for re-inspection in March 2002 (e.g. Branigan and White, 2002, March 14) and ended with the reporting of a press release from OFSTED explaining that the authority was satisfied with the science teaching at the school meeting the requirements of the National Curriculum and that it was therefore not going to re-inspect the school (e.g. Garner, 2002, May 24). It was the one controversial issue that can be seen to have reached some form of closure, at least in terms of media reporting during the sample period.

Other issues were the role of education and religion in multicultural and multi-faith societies. Here the debate was mostly related to Biblical perspectives on creation, but also a few perspectives from other religions appeared in the coverage. Further issues focused on international dimensions of the debate, post-modern relativism and the question if there can only be one or several "truths" about the question of human origins (Chapter 4, Section 4.2.4.).

That various different dimensions were involved in complex socio-scientific controversies is also a result of other studies of media reporting (e.g. Peters 1994; 1996; Holliman, 2000; 2004). The debate around Emmanuel College teaching creationism in science classes consisted of a series of inter-related controversial issues that helped to fuel ongoing reporting. These were scientific, science-based and other controversies (see Brante, 1993). Some of these (e.g. the debate around City Technology Colleges and sponsoring in education) pre-dated this particular debate and only the controversial issue about OFSTED and whether it was going to re-inspect the school was "resolved" in the sample period. The fact that a series of controversies were involved and converged in the debate around Emmanuel College is also a possible explanation for sustained (small-scale) coverage over time (during and after the sample period). Journalists that followed news events were sensitized to issues that had been reported before and could draw on these previous controversial issues when new developments or events emerged and referred back to them (see Kitzinger, 2000). In this regard, without effective closure various issues that were reported before were likely to be picked up again in later coverage.

Furthermore, the findings suggest that public controversies rarely revolve around a single controversial aspect but have various controversies hidden in what appears to be a single controversy. This heterogeneity of complex controversial issues suggests that a range of various expert sources might be quoted in the news coverage.

4. How many and what kinds of expert sources were quoted in articles about the controversy around teaching the theory of evolution and creationism?

Media professionals quote expert sources for various reasons, for instance to illustrate or authenticate and validate their accounts and represent informed views from non-journalistic sources (e.g. Conrad, 1999; McNair 2004). In order to investigate the distribution of experts empirically a quantitative approach of analysing media content was adopted and seven categories of expert sources were set up (scientific experts and institutions; educational experts and institutions; NGOs, campaigners and action groups; politicians, authorities and other officials; religious experts and institutions; media professionals and organisations; parents and/or pupils) (Chapter 3, Section 3.2.4.d). This analysis investigated the distribution of experts in news reports, comments, book reviews and other articles but not in letters (since they are written by the readers of newspapers).

304 experts were quoted directly in the sample. Educational experts (81 quotes – 27 %) and scientific experts (76 quotes – 25 %) were quoted most often. The group of educational experts consisted of educators of Emmanuel College (most notably Emmanuel College's head Nigel McQuoid who is quoted 17 times), representatives of teaching unions and other individual education experts. The group of scientific experts contained various individuals but is dominated by quotes from Richard Dawkins (21 quotes – this made him the most quoted expert in the sample). The category of NGOs, action-groups and campaigners had 56 quotes (18 %). This group included all quotes on behalf of Sir Peter Vardy and his foundation (19 quotes) but also from humanist and secular groups, a parent action-group and also from creationist groups. The category of politicians, authorities and officials had 40 quotes (13 %) and contained statements by Prime Minister Tony Blair (12 quotes), Lib Dem MP Jenny Tonge and all statements on behalf of the Department for Education and Skills and OFSTED. 27 quotes (9 %) were from religious experts and institutions. These were bishops and other individual clergypersons quoted in the sample. Parents and/or

pupils were quoted 20 times (7 %) and this category consisted mainly of parents of pupils at Emmanuel College and pupils of Emmanuel College but includes three US parents and pupils. Four quotes were from media professionals (1 %) (see Chapter 4, Section 4.3.1. and Figure 4.3.).

The relatively high numbers of individual quoted expert sources in debate around Emmanuel College indicate a personalisation of the debate with the scientific experts Richard Dawkins, Emmanuel's head Nigel McQuoid, the sponsor of Emmanuel College Sir Peter Vardy and Prime Minister Tony Blair as the most quoted experts. It is likely that the scientific expert addressed the scientific dimension of the debate, the educational expert and the sponsor of the school educational addressed the educational dimensions of the debate and the high-profile politicians addressed a political dimension of the debate. However, a quantitative analysis of the distribution of the quoted experts did not allow making any qualified statements about the actual arguments the quoted experts brought forward in the debate. Therefore a further qualitative analysis of the statements of quoted experts was needed in order in to investigate their arguments and views. This issue is addressed in the next research question.

Nonetheless, the range of the various quoted experts points to the complex nature of the debate that involved various different controversial issues. That a wide range of experts was involved in this debate is similar to results of other studies on media representations of socio-scientific debates (e.g. see Coleman, 1997; Bucchi, 1998; Miller and Beharrell, 1998; Hargreaves et al., 2003; Holliman, 2000; 2004; Ten Eyck, 2005; Boyce, 2006).

5. What did the quoted expert sources say concerning the debate?

To find out more about the role of experts in a public controversy it is important to know not only how many and what kinds of experts were quoted in the reporting but also what they were actually saying concerning the disputes and which of the various controversial

issues they addressed. In order to investigate this issue empirically a qualitative approach was adopted that examined and categorised all statements from experts sources in quotation marks in all articles apart from the letters (see Chapter 3, Section 3.2.5.b.). The same seven categories were used in this analysis as in the previous research questions in order to be able to make consistent statements and comparisons between the findings of the different types of analyses.

Expert sources of the same category of expertise did not all make similar arguments about the debate but addressed different of the various controversial issues of the debate, used a range of arguments and came to different conclusions about the various issues involved in the controversy.

Education experts were quoted 81 times. The education experts of Emmanuel College (53 quotes), foremost principal Nigel McQuoid (17 quotes), consistently defended the teaching practice of the school by pointing to the good results the school achieved. They also said that their teaching practice met the requirements of the National Curriculum. The main argument for teaching creationism and the theory of evolution was the recourse to an informed choice argument; i.e. they said they were offering both versions to the children so that they could make up their minds and decide for themselves what to believe (Chapter 4, Section 4.3.2.a.).

The education experts related to teaching unions (10 quotes) criticized Emmanuel College but their main argument was against sponsorship in public education. Here it was claimed that Vardy sponsored the school so that he could influence what is taught at the school and claims about religious "indoctrination" at the school were made (Chapter 4, Section 4.3.2.b.).

Various further individual education experts (18 quotes) addressed various issues of the debate and had varying opinions on those (Chapter 4, Section 4.3.2.c.)

Scientific experts were quoted 76 times. The group of scientific experts was dominated by Richard Dawkins (21 quotes – the expert source quoted most often in the sample) and

other scientists that underlined the superior epistemological status of the theory of evolution referring to empirical evidence and attacked the validity of creationist theories for not being scientific theories (together 69 quotes). For these scientific experts science and religion were incompatible and the boundaries between the two needed to be defended in science education. In this regard these scientific experts used the debate around teaching creationism (and particularly arguments about the content of the science curriculum) as a site for boundary work (see Gieryn, 1983; 1995; 1999) defending the boundaries between science and non-science (Chapter 4, Section 4.3.3.a.).

However, three experts in this category attacked the epistemological status of the theory of evolution and challenged the teaching of evolution in science education, arguing that the scientific base for evolution was weak. These scientific experts wanted to use the science curriculum to challenge the consensus view of the scientific community on evolution (Chapter 4, Section 4.3.3.b.). The debate among these scientific experts and the one of the previous group of scientific experts highlights the notion of the controversy being a scientific controversy (see Brante, 1993).

Also, four of the quoted scientific experts argued that scientific and religious accounts did not contradict each other and that both could be true. Subsequently, they argued that there is no conflict between scientific and religious accounts, but that the two address different types and sets of questions. Consequently, none of these four scientific experts challenged the epistemological status of the theory of evolution or the teaching of evolution in science classes (Chapter 4, Section 4.3.3.c.).

Although the group of scientific experts shared a common rhetoric that was based on "the scientific method", "proof" and "evidence" to make "scientific" claims and arguments, a few scientific experts came to very different conclusions concerning the debate around teaching the theory of evolution and creationism. Here it is possible that all the scientific experts drew on an idealized image of scientists being objective, rational and neutral (see Petkova and Boyadejieva, 1994) to add credibility to their arguments. It is also possible

that most of the quoted scientific experts arguing for the scientific consensus wanted to see this idealized image of science taught in science education in order to (re)construct this image in the public. For instance, some scientific experts quoted in the sample defending the epistemological status of the theory of evolution, such as Richard Dawkins or Peter Atkins, portrayed science as the only way of finding the truth by applying "the scientific method" based on empirical validation, experimentation and discussion of results among scientific peers (Chapter 4; Section 4.3.3a.). This notion of conducting science implies that one has to be enculturated into the professional culture of science in order to become a scientific expert and make scientific claims. In this view, statements about science are best left to the scientific experts, since other experts lack the relevant skills, are not as objective and neutral as the scientific experts since they are influenced by opinions or, for instance, religious worldviews. Such arguments defend the authority of their own expertise and exclude experts without scientific expertise from participation in scientific and science-based debates. Wynne (1991) described this type of argument as the "deficit model of science communication": only scientific experts can contribute meaningfully to debates about science, "the public(s)" of science lack(s) the relevant knowledge and needs to be educated by the scientific experts (Chapter 2, Section 2.1.1.).

In contrast, science education experts such as Durant (1993) and others (see Chapter 2, Section 2.2.1) (together with many sociologists of science – see Chapter 2, Section 2.1.) argue that there is not such a thing as a single scientific method (but various scientific disciplines with different methodologies) and that it is important to understand the social and cultural contexts that influence scientific work. For them it is also important that science is relevant not only to the scientific experts, but also that the expertise (and relevances) of citizens can also contribute to the conduct of meaningful science (Chapter 2, Section 2.1.1.). It follows that the citizens of tomorrow should therefore learn how science can be made use of and be relevant in their own lives (Chapter 2, Section 2.2.1.).

That scientific experts use language in a similar way and make arguments that relate to empirical validation was also found in previous studies of scientists' discourses (e.g. Gilbert and Mulkay, 2003; Cook et al., 2004; Burchell, 2007). Furthermore, the majority of the quoted scientific experts arguing against creationism being scientific used the public controversy around teaching creationism at Emmanuel College as an important space for different types of boundary work (Gieryn, 1983; 1995; 1999): first by defending the boundaries of science in science education in schools (particularly in the science curriculum) and second by defending the boundaries of science also in media reporting about the controversy in which they are quoted as the relevant scientific experts.

The NGO, action group and campaigner category had 56 quotes. Secular and humanist organisations and a parent action group argued against the influence of sponsors in education and used the story of Emmanuel College teaching creationism in science classes as an example for the abuse of influence through sponsors in state education (together 21 quotes). Here it was claimed, similar as in the case of the teaching unions, that Peter Vardy sponsored the school in order to "peddle" creationism at the school and "brainwash" children (Chapter 4, Section 4.3.4.a.).

Peter Vardy and the Vardy Foundation (together 19 quotes) consistently denied these claims and said that sponsorship of the school was a result of him feeling responsible for the community he lived in. Vardy and the Vardy Foundation, similar to Emmanuel College educators, also pointed to the good results of the school and used the informed choice argument; i.e. that children are taught both theories so that they can make up their minds (Chapter 4, Section 4.3.4.b.).

Creationist organisations (14 quotes) that were quoted in the coverage addressed a different issue: the moral dimension of the belief in evolution. For them the theory of evolution was more than a scientific theory. They saw it as a materialist and atheist worldview that denied the purpose of human existence and therefore led to sin (Chapter 4, Section 4.3.4.c.).

40 quotes were from politicians, authorities and other officials. In the group of these political experts Tony Blair (12 quotes) backed the school for its good results, OFSTED (4 quotes) and the Department for Education and Skills (5 quotes) confirmed that the school met the requirements of the National Curriculum and members of the opposition (together 9 quotes) attacked the Prime Minister for backing the school and challenged the credibility of OFSTED for writing a favourable report about Emmanuel College (Chapter 4, Section 4.3.5.).

Religious experts (31 quotes) also had diverse arguments. Some of them criticized Emmanuel College and creationism for bringing Christianity into disrepute, others backed the school for its good results and one religious expert attacked the theory of evolution with a similar (moral) argument than that used by the creationist organisations: evolution is a "hoax" disseminated by the atheist scientific community, that leads to mindless violence and sin (Chapter 4, Section 4.3.6.).

Most of the quotes in the parents and pupils category (20 quotes) were from pupils and parents of pupils at Emmanuel College (together 16). These defended the school for its success in education, the excellent results it achieved and also used the informed choice argument in order to defend the school of the allegations that they were "brainwashing" children (Chapter 4, Section 4.3.7.).

As a result, expert sources of the same expert groups addressed different controversial issues within the debate and did not have the same views on the various controversial issues of the debate. For instance, although all scientific experts in the sample were drawing on a similar rhetoric to make "scientific" claims and arguments, a minority of scientists came to very different conclusions concerning the debate around teaching the theory of evolution and creationism. In conclusion, it cannot be said that a certain type of expertise led to a certain view about one of the controversial issues of the debate. Apart from four individual scientists all of the selected scientific experts represented in the sample argued for the majority view of the scientific community on the origins of life.

However, if Merton's (1973) norms of science are respected and taken seriously in the scientific community "scepticism" is one of these norms and a minority of sceptic scientific experts that questions the majority view on "ready made" science (Latour, 1987) could then be healthy for the "quality control" of the knowledge produced by this professional community. Hence, it seems to be the case that scientific norms can be in conflict.

The results lead to the conclusion that there was a complex range of personal views on the topic among individual experts and between groups of experts. Belief systems, knowledge and professional norms are not always compatible. The picture of a simplistic dichotomy, for instance that one group of experts had a common view on a topic that is opposed to the consensus view of another group of experts or a lay audience (e.g. Coleman, 1997) is challenged by this interpretation. In this regard, complex controversies mean that positions can be challenged by a number of controversial issues converging. For instance, one can be pro-evolution, have religious convictions and be against City Technology Colleges and private sponsoring in education. In this sense media professionals can select different quotes from a person to illustrate different positions which will result in a certain framing of the issue. This also justifies the need to investigate what expert sources are saying and not just who (or what type of expert) they are.

Expert sources played a central role in the debate around Emmanuel College. In the representation of the debate it was likely that the selection of certain expert sources led to particular issues being addressed and consequently to particular framings of the debate. However, it is difficult to say what comes first in the production of newspaper stories: the angle from which a story is approached or the selection of expert sources that are going to be cited. Perhaps it is an interplay of both factors. However, it is also likely that the production of media accounts is influenced by previous media reporting and the representation of expert sources in previous accounts (e.g. Kitzinger, 2000). The qualitative analysis of the arguments of quoted expert sources showed that a quantitative

way of determining the distribution of expert sources does not suffice if one wants to investigate what issues are addressed by the different types of expert sources and how they are addressed. Expert sources of the same category do not always address the same issues and also use the same arguments. The results of this analysis therefore suggest that to study expert sources in complex controversies it is necessary to combine three different analyses: first the identification of various issues of the controversies, second a quantification of the expert sources involved and third a qualitative analysis of the statements of the quoted expert sources. Taken together this triangulated approach can illuminate which expert sources address which issues in complex controversies, what they are actually saying about the various issues and what the distribution of represented expert sources and opinions are.

6. How were the expert sources described in the articles?

The way an expert source is described by media professionals can have an influence on the credibility of her or his argument (e.g. Conrad, 1999; Richardson, 2007). To investigate this issue a qualitative approach of analysing media content was conducted that focused on the way quoted experts sources in the sample were described (Chapter 3; Section 3.2.5.b.). Different types of descriptions of the quoted experts were found in the sample. Descriptions could be neutral, for instance by depicting experts by name, profession and role or function. Compared to other studies this is not unusual (e.g. Conrad, 1999).

Some descriptions were found that further qualified and enhanced the credibility of the expert sources and what they were saying, for instance by describing them as leading experts in their field. This was mainly the case with descriptions of scientific experts (Chapter 4, Section 4.3.3.a) and some individual education experts (Chapter 4, Section 4.3.2.c) backing the scientific status of the theory of evolution and defending the teaching of evolution. Also scientific experts (Chapter 4, Section 4.3.3.c) that did not challenge the theory of evolution but saw science compatible with faith were introduced with qualifying

descriptions that depicted them as especially credible scientific experts. Overall, none of the pro-evolution expert sources was framed or described in a way that could potentially challenge their credibility.

Some descriptions were found that could potentially challenge the credibility of the quoted experts. This was the case with two scientific experts challenging the scientific basis for the theory of evolution and the teaching of evolution (Chapter 4, Section 4.3.3.b.), but sometimes also Emmanuel College educators (Chapter 4, Section 4.3.2.a.), Peter Vardy and the Vardy Foundation (Chapter 4, Section 4.3.4.b.) and some members of creationist organisations (Chapter 4, Section 4.3.4.c) were described in ways that could potentially challenge their credibility. This was achieved by describing them as right-wing, fundamentalist or evangelical Christians or creationists, or as being financed by creationist organisations; by selecting certain quotes that contradicted their actual argument (Chapter 4; Section 4.3.3.b.); or by countering their quote challenging the theory of evolution with opposing accounts of a multitude of credible pro-evolution experts (Chapter 4; Section 4.3.4.c.).

This leaves the overall impression that expert sources that were challenging either the scientific base for the theory of evolution or the teaching of evolution were more likely to be described in ways that could challenge their credibility or the arguments that they were making.

However, it was methodologically difficult to reach unequivocal judgements about whether such descriptions always challenge the credibility of these experts or not. The investigation of descriptions of experts showed that is relatively clear which types of descriptions are intended to enhance the credibility of an expert sources but that it is comparatively difficult to determine whether the descriptions challenge the expertise of quoted expert sources. In this regard descriptions that enhanced the credibility of expert sources were less ambiguous and easier to determine. It is possible that descriptions of expert sources will be perceived and interpreted differently by various readers. Here it

would be particularly interesting to do audience research on how various readers interpret the credibility of various experts and their statements, for instance through the use of focus groups (e.g. Kitzinger, 1999; Holliman, 2000; 2004; 2005).

7. Can connections between expert sources quoted in articles referring to the controversy around teaching the theory of evolution and creationism be identified and (re)constructed from the newspaper coverage?

The literature on scientific expertise in complex controversy contexts suggests that a notion of one group of experts being opposed to another group of experts is too simplified. For instance, Limoges (1993) argues that various types of experts form networks in public controversies in order to enhance their credibility and Irwin and Michael (2003) propose the concept of "ethno-epistemic assemblages", heterogeneous groups of experts and citizens, to describe and investigate the various groups with different goals that form in socio-scientific controversies (see Chapter 2, Sections 2.1.1.-2.1.2.). Inspired by the literature on the subject and also some initial evidence that suggested that expert sources formed coalitions also in the controversy around Emmanuel College a qualitative approach of analysing media content was adopted in order to find and categorise connection between the quoted expert sources in the articles in newspapers sample (Chapter 3, Section 3.2.5.c.). In order to find out more about the connections between expert sources the systematic qualitative analysis of newspaper articles was supplemented with more "serendipitous" online searches to find out more about petitions involving several expert sources mentioned in the newspaper articles and other connection between expert sources in the sample (Chapter 3; Section 3.4.).

The results of this analysis show that instead of one group of experts facing another or a group of experts facing a lay audience a far more complex picture emerged in the debate around Emmanuel College. Experts from different fields formed coalitions and mobilised

knowledge, resources and used promotional strategies to pursue common goals (Chapter 4, Section 4.4.).

Three coalitions were identified in Chapter 4: a coalition attacking the teaching practice of Emmanuel College (Section 4.4.1); a coalition defending Emmanuel College (Section 4.4.2.) and third reconciliatory coalition that did not see science and religion in competition (Section 4.4.3.).

These coalitions entailed different forms of expertise and addressed several of the different issues of the controversy. However, the analysis showed that various coalitions were tied together by common argumentation lines about whether Emmanuel College should be supported or not (see Hajer, 1997). Here, the analysis of the statements of the various expert sources quoted in the coverage was helpful to (re)construct how the various arguments of the expert sources in different expert groups played together (Chapter 4, Section 4.3.).

Moreover, manifest heterogeneous action groups also wrote petitions and called for particular actions. Here it is possible that the collection of different forms of expertise in action groups was a strategy to receive media attention and enhance credibility through the display of codified consensus. However, the various action groups that appeared in the coverage did not receive similar amounts of coverage in the newspaper in the sample. The action groups against Emmanuel College received most attention in the newspaper sample, whereas a petition defending the teaching of creationism in science classes was reported in only one specialist newspaper and the letter to the Prime Minister by a reconciliatory action group was not reported at all (but could only be found through online searches).

The results of this section of the study suggest that newspaper coverage of the controversy around Emmanuel College provided a platform for various individuals, interest groups and institutions, who partly used newspaper reporting (and the internet) as an important channel to argue their case. Here the various groups could refer to the democratic "fourth estate" function of the media of being advocates of public debate. The petitions written in

the debates around Emmanuel College illustrate the ability of a number of interested parties to mobilize and form alliances of experts and citizens and campaign on specific issues, thereby attempting to enhance their own credibility and legitimacy and to undermine the credibility and legitimacy of opposing groups. Beck (1992) describes this mobilisation of resources in controversy contexts as the politics of expertise and counter expertise (Chapter 2, Section 2.1.1.b).

It is argued that various experts involved in a controversy can form collaborative networks of expertise in order to pool resources and enhance their credibility and influence in public debates. It is possible that networks of pro-evolution experts that support the scientific consensus have better chances of getting access to the media than a single group of experts on their own. Networking processes between expert sources could be found between various groups involved in the public debate around Emmanuel College. This issue of collective forms of expertise in order to enhance credibility in public debates is theoretically still relatively under-examined (see Limoges, 1993; Irwin and Michael, 2003) and this study provides further empirical evidence of the importance of understanding expertise not only in individual but also in collective and networked terms. Irwin and Michael's (2003) concept of ethno-epistemic assemblages is a helpful tool to investigate the issue of heterogeneous groups forming in disputes about science and technology. "Epistemic" refers to various truth claims, "ethno" connotes the idea of locality and situated-ness of knowledge "assemblage" refers to interweavings of citizens and experts (Chapter 2, Section 2.1.1.). The analysis presented in Chapter 4 shows that especially the coalition that formed against and the one backing Emmanuel College fulfilled all three criteria: They entailed different types of truth claims (ranging from scientific arguments made by scientific experts; to arguments about the value and practice of education; political arguments about the credibility of a particular authority and about the role of sponsors in state education; and the religious/moral views on evolution and science), entailed the local knowledge of people affected by the controversy (parent-action groups

against Vardy-sponsored schools versus the parents of pupils and pupils at Emmanuel College that defended the school) and were consisting of interweavings of different types of experts and citizens (scientific experts, education experts, religious and political experts, NGOs and action groups and parents and pupils) (Chapter 4, Section 4.4.).

However, the results of this study also point to the methodological challenge of (re)constructing and examining such emerging coalitions. Connections between experts could not be reconstructed from the newspaper sample alone. It was necessary to make use of internet searches and web-based sources which are less reliable and very difficult to investigate systematically. Internet content is more "fluid" than the content of newspapers, which is stored and accessible in archives and databases. Information available on the internet changes quickly and websites can be updated or deactivated, which makes it particularly difficult to analyse the content of relevant websites retrospectively (e.g. Hewson et al., 2003). Coalitions of experts and citizens might form only during controversy contexts and break up and disappear once a controversy has been resolved or if they go on for long periods without being resolved.

8. What kinds of journalists reported the controversy?

The research presented in this thesis was also interested in the question whether there is a difference in how various specialist and other correspondents reported the debate around Emmanuel College. In order to investigate this question it was necessary to interview different types of media professionals. To be able to investigate the different articles written by various general and specialist correspondents and to compare them with the statements of the interviewed media professionals it was necessary to identify which and how many articles were written by what kinds of correspondents.

In order to investigate this issue a quantitative approach of media analysis was adopted to determine the distribution of bylines that described the specialism of the correspondents

(Chapter 3, Section 3.2.4.b). The distribution of bylines could only be determined for the news reports, because other types of articles had no bylines that qualified the specialism of their authors. This analysis also informed the selection and recruitment process of the interviewed media professionals. Furthermore, the results of this analysis also informed which expert sources were quoted by which types of correspondents in a later research step.

Almost half (55 articles) of the 111 news reports in the sample were written by specialised correspondents (Chapter 5, Section 5.1.). The other half had no bylines. Education correspondents and editors were the specialists that wrote most (33 reports) of the news reports about the controversy in the sample. This number is affected by the inclusion of two specialist publications on education in the sample (see Chapter 3, Section 3.2.4.b).

Correspondents, reporters and editors specialised in science wrote 12 news reports. Foreign news correspondents wrote 6 articles. Two articles were written by religious affairs correspondents. One news report was written by a North of England correspondent and another news report was written by a correspondent for parliamentary affairs.

The debate was covered by specialist correspondents and general news reporters. That debates about science and technology are covered by various general and specialist correspondents is not unusual when compared to other studies (e.g. Hargreaves et al., 2003; Holliman, 2004). However, it depends on the specific topics and issues that are controversial, for instance medical, environmental, or political affairs correspondents as well as general news reporters can all be involved in covering issues about science and technology. The results of this analysis suggest that educational correspondents, science correspondents and general news reporters were the media professionals that wrote most of the news reports about this science education controversy.

9. How did journalists judge the newsworthiness of the story?

Media professionals must make selections of the events they are going to report (e.g. Gans, 1979). They do this by judging the news value(s) of the events (e.g. Allan, 2000; Palmer, 2002; McQuail, 2003; McNair, 2004; Schultz, 2007). In order to find out more about the representation of expert sources in the debate around Emmanuel College it was helpful to find out which news values were seen as being relevant by the media professionals in this case study about coverage of science education.

In order to investigate this issue seven media professionals (six of which reported the controversy around Emmanuel College in the newspapers included in the sample) were interviewed using semi-structured interviews about media production processes and the selection and representation of expert sources (Chapter 3, Section 3.3). The media professionals were also asked how they judged the newsworthiness of the debate around Emmanuel College. Their statements on news values could then be compared with the published accounts in the newspapers sample.

The interviewed journalists ascribed different news values to the story of Emmanuel College (Chapter 5, Section 5.2.2. – 5.2.3.) based on the various strands of controversy (Chapter 4, Section 4.2.). Furthermore, journalists emphasized the news values of conflict and controversy, unusualness and unexpectedness of the story, the sensitization through familiar events in other countries and the reference to "elite-nations" (the controversy about creationism in the USA), human interest and also the involvement of well known and powerful people such as the Prime Minister. The fact that more than one news value and several experts with different areas of expertise were involved and challenged each other's expertise and credibility in the story around Emmanuel College together might also explain why the story received further coverage and never disappeared completely from coverage in the sample period. That several news values are involved in the coverage of complex issues is not unusual. The strong news values of conflict and controversy have

also been noted by other authors (e.g. Glasgow University Media Group, 1976; 1980; Mc Quail, 2003; Schudson, 2003; McNair, 2004), especially so in coverage of science and technology news (Goodell, 1987; 1989; Hansen, 1994; Nelkin, 1995; Miller, 1999; Holliman, 2000; 2004). The educational correspondent Baker (1994; 2000) also notes the news value of conflict and controversy in stories about education.

None of the interviewed correspondents saw science education in England and Wales in danger of being compromised by creationist ideas. Hence, the news values of the story seemed to be at odds at times with the personal opinion of the interviewed journalists and special correspondents. However, the fact that they reported the story of Emmanuel College as a public controversy points out that professional judgement of news overrode their personal view on the issue. What makes news is also based on the implicit judgement by media professionals about what the audience finds important or interesting (e.g. Thompson, 1995; Aldridge, 2007). It therefore seems fair to say that the media professionals assumed a public interest in this story. However, media professionals also follow the accounts of other journalists and what other newspapers and media outlets report and their judgement about what is newsworthy and what is not may be influenced by the self-referential nature of the media and previous media accounts (e.g. Kitzinger, 2000; Luhmann, 2000).

Of all the controversial issues that were involved in the debate about Emmanuel College the teaching of creationism and especially the part-sponsored character of Emmanuel College being additionally funded by a (religious) sponsor were the main issues that the interviewed media professionals addressed when asked what the issues of the controversies were. The issue of sponsorship involvement in state education was already controversial before the story of Emmanuel College broke. The educational correspondents but also others could refer this story back to a pre-existing controversy that was covered in the newspapers before. However, the sample of the interviewed media professionals is limited and most of the interviewed correspondents were educational correspondents. In order to

widen the scope of this account it would be helpful to conduct further interviews with various specialist and general news reporters. However, the experience gained in conducting the research for this thesis and also in previous studies (e.g. Cook et al., 2006) showed that it is difficult to recruit media professionals for the purpose of interviewing them about their professional practices. Furthermore, the methodological requirement to conduct analysis of media content first also means that interviews with media professionals are likely to happen some time after they have done the reporting.

10. Did the area of specialism of the specialist correspondents affect the selection and representation of expert sources in the coverage and if so, how?

Only a small amount of work has been done about the professional practice of educational correspondents, how education is covered in the media and how educational correspondents select and represent expert sources (see Baker, 1994, 2000; Pettigrew and MacLure, 1997; Jones, 2000; MacMillian, 2002; Hammersley, 2003; Ellsmore, 2005; Hargreaves et al., 2007). The professional practice of science correspondent and the selection of expert sources has been researched in more detail (e.g. Goodell, 1987; 1989; Hansen, 1994; Nelkin, 1995; Conrad, 1999; Holliman, 2000; 2004). The approach that was taken in this study to find out more about the selection of expert sources of various specialist correspondents was to investigate an issue that was covered by several types of correspondents and then to investigate the distribution of expert sources quoted by the various specialist and non-specialist correspondents. The result of this investigation and other results of the analysis of media content (Chapter 4, Sections 4.2. – 4.3.) could then be compared with the statements of the interviewed media professionals on how they selected expert sources and assessed their credibility in the case study (Chapter 5, Section 5.2.5.).

The two types of specialist correspondents that were most relevant in reporting the story of Emmanuel College were educational and science correspondents. This was the case

because two newspapers specialised in education were included in the sample (see Chapter 3, Section 3.2.4.b) but also because this story about science education fell in the specialist area of both of these types of correspondents. It was found that the area of specialism affected the selection and representation of expert sources: The range of expert quoted by educational correspondents was broader than the range of experts quoted by science correspondents. Science correspondents relied heavily on scientific experts (Chapter 5, Section 5.2.4.). This is also documented in the literature (Shepherd, 1981; Goodell, 1987; 1989; Dornan, 1990; Hansen, 1994; Nelkin, 1995; Conrad, 1999; Holliman, 2000; 2004). This finding was confirmed in the interviews. Educational correspondents gave consistent answers on the selection of expert sources and stated that in education coverage generally the voice of the teaching profession, representatives of authorities or the government, individual education expert sources as well as pupils or parents needed to be quoted. Whereas the interviewed science correspondent emphasized trust in established expert contacts, their specialist knowledge, status and reputation among peers as relevant criteria for the selection and credibility of expert sources, educational correspondents had extended criteria for the selection of other types of expertise. They used similar criteria for assessing the expertise of their expert sources but for them expert sources should also be as close as possible to the institution or issue the story is going to be about. For educational correspondents closeness, authenticity and the validity of an expert source account about a specific issue could be as important as the reputation of the expert source. Professionals such as head teachers and spokespeople for teaching unions were awarded credibility for their specialist knowledge as education experts. Authorities such as the (then) Department for Education and Skills were seen as being credible for providing valid and reliable information. Both the science correspondent and the educational correspondents said that they knew most of the relevant experts personally and kept in touch with them, but educational correspondents had to be more proactive in getting access to education experts

of new schools. In this sense the selection of expert sources and the assessment of their credibility is based on their cultural and social capital (Bourdieu, 1986).

One exception was the educational correspondent writing for a regional/local newspaper. This correspondent suggested that the nature of the newspaper this journalist was writing for had an influence on the selection of expert sources by the feeling of being responsible for the representation of voices of the local community that the newspaper addresses (Chapter 5, Section 5.2.5.). This finding confirms the results of a previous study on regional/local media (Aldridge, 2007). Furthermore, this result points to the idea of a democratic "fourth estate" function of the media among media professionals that could potentially influence the production of media accounts. This idea that the media have to be advocates of "the people" and represent their views in the coverage could also influence media production of other media outlets than regional/local newspapers, as the representation of expert sources in Holliman's (2000) study of news coverage of illnesses related to service in the first Gulf war demonstrates.

Overall, these results point to varying notions of credibility and relevance of expert sources among specialist correspondents that influenced the selection and representation of expertise in the debate around Emmanuel College (Chapter 5, Section 5.2.5.). This means that the specialism of the correspondents has an influence on who is quoted in newspaper articles and also which issues are addressed in the newspaper accounts.

Another factor that has been found influencing the selection of expert sources was the journalistic norm of objective reporting. Objectivity in journalism is achieved by reporting factual information accurately and balancing conflicting accounts in public controversy contexts. However, there were different notions among correspondents about the controversy around Emmanuel College being a legitimate or illegitimate one. Here it is possible that the different notions addressed different controversial aspects of the debate (Chapter 5; Section 5.2.7.). The interviewed science editor did not recognize the debate as being a legitimate controversy therefore accounts did not need to be balanced. In contrast,

all of the interviewed educational and other correspondents saw it as their task to report the debate in a balanced way (Chapter 5, Section 5.2.7.).

Whether articles are balanced or not influences which expert sources will be represented. That science correspondents tend not to balance accounts about creationism and other specialist and general journalists do has also been reported in the literature (e.g. Mooney and Nisbet, 2005; Rosenhouse and Branch, 2006). This result also links back to the earlier analysis which investigated which types of expert sources were quoted by the various (specialist) correspondents. Here, the combination of an analysis of media content and media production was particularly fruitful since it allowed to cross-examine results from the two different types of analyses.

In sum, in this instance the science editor and the educational correspondents had slightly different criteria for the selection of some forms of expertise and slightly different notions of objectivity based on balancing expert source accounts. The overall results produced different representations of expert sources and emphasised different issues in the controversy.

These results indicate that the specific "desk" that covers a particular type of story can have a direct influence on which expert sources are selected, how they are represented and also which issues will be addressed in newspaper accounts. This is especially relevant in stories about science education which can be covered by science correspondents, educational correspondents and other journalists. A question that arises from this result is who it is that assigns particular "desks" to cover a certain story and how the selection processes of specialist and general news correspondents take place in the news production process.

These results also point to the challenge of reporting complex controversies in the media. The education correspondents reported a range of views whereas the science journalists did not. Here, it depends on the point of view how the coverage of the debate is assessed. Given the scientific consensus on the theory of evolution as the valid explanation for the

origins of life the science correspondents reported the "scientifically correct" view. Arguing from a pluralist viewpoint that values the democratic representation of a plurality of views the educational correspondents came closer to reaching this democratic ideal. People with different professional and personal ideals will therefore probably assess the representation of expert sources and the coverage of the debate in different ways.

11. What can be learnt about journalistic practice from this case study?

The results of this study suggest that journalists form a community of practice (Lave and Wenger, 1995) that follows professional rules, norms and guidelines such as the norm of objective reporting (Hemanus, 1976; Allan, 2000; Schudson, 2001; 2003; Singer, 2003; Deuze, 2005; Starkey, 2006) but that (depending on the issue to be reported) these are enacted in subtly different ways on different specialist desks and in national, specialist and regional/local newsrooms.

In order to become a professional journalist one needs to have a degree of formal training but enculturation into the professional community is also important (Chapter 5, Section 5.2.1.). Professional experience is gained and contacts to expert sources are established by practicing professional journalism over time. In this sense, journalists need to acquire cultural and social capital (Bourdieu, 1986) in order to become successful media professionals. Journalistic practice is influenced by common restrictions such as space and time which can also influence the selection and representation of expert sources (Chapter 5; Section 5.2.5. and 5.3.). General news reporters and specialist correspondents also share skills and conventions, for instance how to elicit suitable quotes from expert sources and how to use these quotes effectively in the articles (Chapter 5, Section 5.2.6.).

Journalists also gain orientation about news events by following the actions and artefacts of other media professionals (Luhmann, 2000) and it is the community of journalistic practitioners that decides what journalism is and what is not. Different ways of

approaching and reporting a particular story are possible as long as the resulting reports are acknowledged by the professional journalistic community (Tuchmann, 1972; Ryfe, 2006). Luhmann (1992; 2000) therefore describes both, journalism and science, as self-referential social systems with own codes of operation and communication (see also Weingart, 2005). Peters (1995) describes the encounter of scientific experts and journalists as the clash between two different professional cultures. The story about Emmanuel College illustrated that for both of these professional cultures the notion of objectivity is particularly relevant and at the same time their notions of objectivity were very different. Most of the quoted scientific experts in the sample and also the science correspondent had an absolutist position on objectivity in this case study; they argued that evidence and the facts speak for the truth (of the theory of evolution). Consensus about the validity of the theory of evolution is established by the communication of results within the scientific community, but not by discussing them with non-scientific experts. In contrast, the educational and other correspondents had a more pluralist understanding of objectivity; by balancing the accounts of various positions (on the theory of evolution) they reckoned that it was up to the readers to decide what they considered to be the truth, in that regard they would solely "report the facts" (see also Tuchman, 1972). To a certain degree this argument mirrors the informed choice argument brought forward by the Emmanuel College sources when they explained why they taught creationist accounts alongside the theory of evolution in science classes; so that the children could decide for themselves what to believe.

The selection of a case study about science education in the media was helpful in investigating the professional practices of two different kinds of specialist correspondents. Science news is often covered by science correspondents and the expertise of scientists is mostly like to be relevant in science coverage (e.g. Nelkin, 1995; Conrad 1999). Newspaper stories about science education fall into the area of specialism of science correspondents *and* educational correspondents but can also be covered (in the same way as science news can) by other correspondents as well. In this case it was less obvious

which types of expert sources it were that had the relevant type of expertise. The results of this study showed that coverage of the same issue by different types of specialist correspondents will result in the representation of different types of expert sources.

12. Did promotional strategies of expert sources and institutions play a role in the coverage of the debate around Emmanuel College?

Various authors in the literature on media production argue that it is not only important to study media production processes of the media professionals but also how expert and other sources try to get access to the media (e.g. Anderson, 1993; Linne, 1993; Schudson, 2003; McNair, 2004). Previous studies on media production presented evidence that various expert sources employed promotional strategies in order to influence the production of media accounts (e.g. Gandy, 1982; Davis, 2000; Miller, 2002; Holliman, 2000; 2004).

Also several of the quoted expert sources in the sample seem to have been aware of the importance of their perspective being reported. For instance, the Vardy Foundation and Emmanuel College employed public relation experts to handle press enquiries. They were willing to be interviewed, stayed in touch with media professionals and welcomed visits of (at least some) journalists. In this respect, at least three of the interviewed educational correspondents visited the college or spoke to its staff whilst the science editor complained of a lack of access to the school. But also others of the quoted expert sources used the services of professional communication experts (Chapter 5, Section 5.3.). It is also possible that the combinations of expertise and credibility, the display of codified consensus among various types of experts in public calls for actions that were forwarded to newsrooms were part of a tactic of receiving media attention and publicity (Chapter 4, Section 4.4.).

Furthermore, it emerged in the interviews that the internet is an important tool for journalists and that expert sources and institutions that have own websites (as many of the expert sources in the debate around Emmanuel College had) make it easier to be

proactively contacted by journalists but also that websites may be cited reactively in news reporting (see also Alan, 2006; Holliman, 2000; 2007). Both took place in the production of stories about Emmanuel College.

The online searches that were used as an additional strategy for information and data collection about connections between experts (Chapter 3; Section 3.4.) were useful in the sense that they showed that almost all of the petitions that were drafted during the controversy were also made available online and that many of the expert sources quoted in the sample provided web-based materials in order to represent their views on the internet. These are not exclusively and specifically designed for media professionals but evidence was found that media professionals also used these web-based materials for their background research and in some cases quoted from websites instead of contacting expert sources directly. In this regard the findings suggest that further research on the use of web-based materials as "information subsidies" (Gandy, 1982) could be a fruitful area in order to investigate how the internet is and can be used in promotional strategies of expert sources and institutions.

13. How can a study of production provide a useful perspective that further informs the study of newspaper content in particular about the selection and representation of expert sources?

The analysis of production illuminated different criteria for expert selection and representation, particularly of educational and science correspondents. It showed that especially science correspondents can be in symbiotic relationships with scientific experts on which they rely in producing stories (Goodell, 1987; Hansen, 1994; Nelkin, 1995; Conrad, 1999; Holliman, 2000; 2004; 2007). Science correspondents also depend on publishers of scientific journals since they often get their information from embargoed press releases from scientific journals before they are published (e.g. Hansen, 1994;

Nelkin, 1995; Holliman, 2000; 2004; 2007; Whitehouse, 2007). However, the downside of this symbiosis is that science correspondents may produce stories that agree with scientific experts if they do not want to lose them as sources (Chapter 5, Section 5.2.7.). Perhaps this was also a reason why Emmanuel College sources said they did not want to speak to the science editor.

Furthermore, science correspondents such as the one interviewed in the study are often also formally trained in scientific disciplines themselves (see also Hansen, 1994; Nelkin, 1995). In order to report a serious challenge to the "ready-made" scientific consensus they might want to see the type of scientific evidence they were trained to value and see as reliable. As the interview with the science editor showed, a religiously motivated challenge to the theory of evolution was in this sense not regarded as the type of evidence the science correspondent would accept. This might explain why descriptions of scientific experts that contested the theory of evolution in reports written by science correspondents occasionally challenged their credibility (Chapter 4, Section 4.3.3.b.) and that accounts by science correspondents sometimes broke the norm of balanced reporting (Chapter 5, Section 5.2.7.). As shown before scientific experts used debates about the science curriculum as a site for the boundary work of science. Not only the science classroom but also media accounts of science are used as sites for the boundary work of science. This analysis suggests that news accounts produced by specialist science correspondents are an effective extension of the boundary work of science, since the accounts produced by science correspondents are most likely to reconfirm the scientific consensus – as when they write about science education. Representations of science education constructed by other media professionals might underline very different aspects of science education (e.g. a citizenship perspective) and also have entirely different implicit notions of the nature of science.

A consequence of the journalistic practice of balancing accounts is that polar views at the end of a spectrum of opinion will be quoted in opposition to each other and moderate views of the middle ground will often be left out. This can explain why, in sum, the

coalitions attacking and backing Emmanuel College received considerably more media attention than the coalition arguing for a moderate reconciliatory position (Chapter 4, Section 4.4.). However, there was also some confusion in the media accounts and also among the interviewed media professionals (also due to the retrospective nature of the study) whether Emmanuel College was guilty of some of the accusations that were reported in the coverage.

Furthermore, the results of this study show that the specific "desk" that is covering a story that could be covered by various specialist or general journalists will have an influence on the types of experts that are quoted and therefore probably on the way the issue is framed in the news. It is therefore likely that the accounts of science education (and therefore the implicit notions of the nature of science) of various specialist and other correspondents differ. Accounts produced by educational correspondents will in this regard be less suitable for the boundary work of science than the accounts produced by science correspondents.

The analysis of media production was particularly useful in a number of ways. For instance, it could confirm that the statements on expert source selection of the interviewed media professionals matched the distribution of quoted experts in the sample in accounts written by specialist correspondents (Chapter 5; Section 5.2.4. and 5.2.5.). The methodology applied also allowed to check whether the notion of a specialist correspondent working for a regional/local newspaper feeling responsible for the representation of voices from the local community had an effect on the selection of expert sources in the newspaper accounts. An analysis of where pupils and parents were quoted confirmed this view: 10 of the 20 quoted parents and pupils and three of the four spokespeople for parent action groups were quoted in regional/local newspapers (Chapter 5; Section 5.2.5.). Furthermore it was possible to check whether the statement of not balancing accounts of expert sources in this debate by the science editor also applied to the cases of other science correspondents (the results confirmed that science correspondents mostly quoted scientific experts in this story). The study of production therefore provided

useful perspectives that informed the study of newspaper content about the selection and representation of expert sources in this story about science education.

## *6.2. Strengths, limitations and suggestions for further work*

A major strength of the design of this study is that an analysis of media production supplemented a qualitative and quantitative analysis of media content. Content analysis alone could not answer questions about why certain expert sources were selected, how these selection processes took place and why some expert sources were seen (and described) as being more credible than others, but the examination of journalistic practice could. The production analysis did provide useful additional perspectives that further informed the results of the analysis of media content. Using this combined approach it was possible to check whether correspondents working for regional/local newspapers do represent more voices of non-specialist community members, such as pupils and parents. The results of the analysis of media content on what kinds of expert sources where quoted by the different types of specialist correspondents that wrote the news reports included in the sample could be compared to the statements of the interviewed specialist correspondents and the production analysis also provided further perspectives on how the selection of expert sources and the assessment of their credibility in the debate around Emmanuel College worked in practice. The design of the study also allowed for a comparison of the statements of specialist correspondents on objectivity and the professional norm of balancing accounts and whether the newspaper reports written by various specialist correspondents included in the sample were actually balanced or not.

The approach that was taken in this study therefore allowed for comparisons of results of the qualitative and quantitative approach of analysing media content with the results from the production analysis. This strategy facilitated a cross-comparison of the results presented in this study through various types of analyses and it is likely that this approach

increased the overall comprehensiveness of the results presented in this thesis. However, the reliability of the presented results could be increased by the introduction of coder reliability measures. Furthermore, the number of interviewed media professionals in this study is limited and more educational correspondents were interviewed than other types of correspondents. Here, it would be helpful and increase the scope of the study if further interviews with specialist and general news correspondents had been conducted to see if consistent patterns of expert selection, assessments of the credibility of expert sources and differences and similarities in journalistic practice emerge. However, a result of this and previous studies on the professional practice of media professionals is that it is difficult to recruit busy media professionals for interviewing purposes. Another limitation that emerged in conducting a retrospective production analysis was that some of the interviewed media professionals said that they could not remember some of the (important) specific details of the debate around Emmanuel College (Chapter 5, Section 5.2.3.). This is partly a result of having to study media content first and media production afterwards.

A methodological strategy to avoid this problem could be to conduct ethnographic research in newsrooms (see Hansen et al., 1998; Boyer and Hannerz, 2006) such as the research conducted by Tuchman (1972; 1973; 1976; 1978); Gans (1979) or Schultz (2007). Data collected by a participant or non-participant observer could also shed light on the interesting question who it is that decides which specialist correspondent or general news reporter is going to cover a particular story and how these decisions are made and also if there are differences between newsrooms (if ethnographies in different newsrooms can be conducted). This approach would have the advantage that the researcher observes the professional culture and practice of media professionals and would not have to rely on the (retrospective) accounts of media professionals. However, in investigating the production of newspaper accounts of science education it might be the case that only very few or even no stories on science education are produced during the (limited) period that a social scientific observer can stay in a newsroom.

Another issue that emerged from the investigation of the types of articles and coalitions that formed in the debate around the controversy is that many letters were written and published during the sample period. The comparatively high amount of letters in the sample (Chapter 4, Section 4.1.4.) suggests that it would also be interesting to investigate the content of letters systematically and investigate if expertise also played a role in these letters. In this regard it would also be interesting to interview the letter writers on their motivations about writing letters and also to interview the letter editors of newspapers about the selection processes of letters that are going to be published. Furthermore, the analysis of coalitions and promotional strategies also showed that additional to the newspaper reporting the internet was used by several of the quoted experts and institutions to publicise their views and address various issues of the controversy and also to publish petitions and calls for action online. Some of these web-based materials also found their way into the newspaper coverage (Chapter 5, Section 5.3.). This result suggests that it would be worthwhile to study how the use of web-based materials (for instance as a promotional strategy) could influence the professional practice of journalists and media production processes (e.g. Alan, 2006; Holliman, 2000; 2007). In this regard it also seems worth thinking about how the use of the internet by various experts and citizens could be investigated in complex controversy contexts. So far it has been notoriously difficult to study the "fluid" interactions on the internet in systematic ways because of the volatile nature of the internet as a medium (Hine, 2000; Hewson et al., 2003).

Further research could also investigate whether coverage on creationism and the selection of expert sources differs in various countries and also whether the journalistic practices of specialist and general correspondents change in particular cultural settings.

Moreover, an examination of media content and production does not allow making any statements about the reception of this story by heterogeneous audiences (e.g. Hansen et al., 1998; Krippendorff, 2004; Flick, 2006; Richardson, 2007). In order to investigate this matter further it would be helpful to conduct research on the reception of the debate about

Emmanuel College and the credibility of expert sources. Here it would be very valuable, for instance, to investigate the reception processes of various samples of members of the public and experts through the use of focus groups (e.g. Kitzinger and Barbour, 1999; Holliman, 2005) in order to investigate how the debate around Emmanuel College was perceived by various readers and how the different issues, the expertise and the credibility of the quoted experts were assessed by them. In particular the investigation of descriptions of experts showed that is relatively clear which types of descriptions are intended to enhance the credibility of an expert but that it is difficult to determine whether descriptions challenge the expertise of quoted experts. Here it would be particularly interesting to do research on how these issues are perceived by various readers, for example by inviting them to judge statements of credibility from the coverage.

Furthermore, it would also be helpful to interview the expert sources that were quoted in the sample about their views on the debate and how they think the debate and themselves were represented and also about the issue of how they got (and maybe kept) in touch with the media professionals who interviewed them. Additionally, it would also be interesting to find out how the networking of experts worked in practice, how the action groups that emerged in the coverage came into being and how the signatories of the petitions and members in action groups assessed the impact of their calls for action.

## *6.3. Outlook*

The debate about creationism in science teaching did not end with the end of the sample period. Emmanuel College kept the label of "the school teaching creationism in science classes" in news reports (e.g. Pyke, 2004, June 13; Mansell, 2005; May 6; Steward, 2006, March 10; Bloom and Marley, 2006, October 27). In August 2005 it was reported that another car dealer was going to sponsor a City Academy in the Midlands. The sponsor, Bob Edmiston, was described as a Christian fundamentalist who did not believe in

evolution and constant references to Peter Vardy and Emmanuel College teaching creationism were made (e.g. Henderson, 2005, August 12). In February 2006 it was reported that the Royal Society got involved in the debate around creationism after it was reported that creationism among evangelical Christians and Muslim students might be on the rise at UK universities (Campell, 2006, February 21). Further reports claimed that creationism could be taught in more and more schools in Britain (Walker, 2006, May 18) and also that the neo-creationist Intelligent Design theory could gain a foothold in British schools (Shepherd and Farrar, 2006, June 23).

In October 2006 it was reported that the Emmanuel School Foundation wanted to sponsor another school in Blyth. However, after opponents of the school argued that creationism would be taught at the school in science classes more than 1000 parents signed a petition against them sponsoring the school. It was reported that this petition was backed by local politicians, teaching unions and scientists, such as Richard Dawkins (Basnett, 2006, October 16). *The Guardian* ran another half-day seminar for science and RE teachers entitled *Creationism and Intelligent Design - do they have a place in the school curriculum?* on 1 December 2006 and Jha (2007, May 29) reported that Richard Dawkins and other scientific experts opposed the idea of the president of the Royal Society, Martin Rees, that scientists should form alliance with mainstream religion in order to fight extremism. Dawkins, who signed a petition together with various bishops in the controversy around Emmanuel College (Chapter 4, Section 4.4.), is quoted in the article:

> "If we are too friendly to nice, decent bishops, we run the risk of buying into the fiction that there's something virtuous about believing things because of fate rather than because of evidence."
> (quoted in: Jha 2007, May 29: 11).

These and other articles published after February 2004 claimed that various creationist movements (also of non-Christian religions) were attacking the theory of evolution and

influencing science education in schools and also at the higher education level. Nisbet and Mooney (2007) also think that the creationism issue is not going to disappear and assume that it will stay to be a politically charged issue. However, they think that this is also partly the fault of the scientific experts:

"[...] many scientists not only fail to think strategically about how to communicate on evolution, but belittle and insult others' religious beliefs." (Nisbet and Moony, 2007: 57).

From September 2006 a new Key Stage 4 programme for the study of science had to be taught (Burden, 2005). Changes to the programme of study also led to a change in the Paragraph 1b about scientific controversies resulting from different ways of interpreting empirical evidence (Chapter 1). This paragraph now reads:

"(1) Pupils should be taught:

(b) how interpretation of data, using creative thought, provides evidence to test ideas and develop theories."

(QCA, 2005)

The reference to Darwin's theory of evolution as an example for a scientific controversy had been taken off (Chapter 1). This might have been a result of the calls for action by various action groups and the sustained coverage of the debate around Emmanuel College teaching creationism in science classes (see also Allgaier and Holliman, 2006). In this sense one of the controversial aspects of the debate has been resolved at least in terms of the codified curriculum and the boundary work of the scientific expert sources that argued that religious accounts must be kept out of science classes could be argued to have succeeded.

However, it is unlikely that there will ever be complete control of what exactly is taught in the science classrooms. Also because of the complex nature of the controversy it is likely that in the future debates around creationism will keep their news value and it is therefore

even more important to get a better understanding of how such complex debates come to be represented in the media. This study made an important first step by investigating the role of expert sources and journalistic practice in the debate around Emmanuel College teaching creationism and evolution.

The research presented in this thesis showed that this science education controversy was not a single controversy but that the reporting focussed on various controversial scientific, science-based and other issues that were related to the debate. The nature of this controversy is therefore similar to those of many other complex scientific and science-based controversies that have been studied previously. However, the scientific controversy around the theory of evolution is a controversy about an accepted "ready made" scientific theory that is the consensus view of the scientific community. This is rather unusual since many of the other public controversies about science and technology are often about new scientific knowledge that is still "science in the making" (Latour, 1987) and therefore controversial among scientific experts. Because of the different controversial issues that were involved in the debate a range of different expert sources could be quoted in the coverage about Emmanuel College, addressing different of the several controversial elements with different types of arguments. Different types of expert sources also got together and formed various heterogeneous coalitions in order to attack or back Emmanuel College and its teaching practice for various reasons. The evidence presented in this thesis therefore suggests that it necessary to understand expertise not only in singular and individual terms, but that expertise should also be understood in plural and networked terms in public controversy contexts (see Limoges, 1993; Irwin and Michael, 2003).

The specialist correspondents that reported the debate had different criteria for the selection of expert sources which resulted in varying accounts of the debate in the newspapers. This means that the type of correspondent that is selected to report a story about science education will have an influence on what kinds of expert sources will appear in the account and thereby on the way the issues are framed.

Media reporting and science education are two key sites for the (re)construction of the boundaries of science. That media reporting and other forms of popularization of science provide powerful tools for sustaining the social hierarchy of expertise and the epistemic authority of the scientific experts is not new (see Hilgartner, 1990). However, in the case study presented in this thesis various interest groups also tried to influence what is taught and how science is taught in formal science education and were therefore promoting different implicit notions of the nature of science. The discussion of the boundaries of science was crucial for those experts and specialist correspondents that wanted to see boundaries between science and non-science kept in place. Science education is not only crucial for the reproduction of science by preparing some young people for a professional career in science, it is also crucial for the (re)production of (scientific) expertise. In England and Wales science is a compulsory core subject of the National Curriculum that all pupils have to study. Giddens (2000) argues that it is part of the "hidden curriculum" of formal (science) education to instil trust in technical expertise that is a crucial pre-requisite for the functioning of many of the institutions in modern societies:

> "What is conveyed to the child in the teaching of science is not just the content of technical findings but, more important for general social attitudes, an aura of respect for technical knowledge of all kinds. In most modern educational systems, the teaching of science always starts from "first principles," knowledge regarded as more or less indubitable. Only if someone stays with science training for some time is she or he likely to be introduced to contentious issues or to become fully aware of the potential fallibility of all claims to knowledge in science." (Giddens, 2000: 89)

In this view, it is the task of formal science education to promote an image of science producing reliable knowledge and certainty. In Giddens' (2000) view this image is the foundation of trust in abstract expert systems and the basis of the trustworthiness and authority of (scientific) expertise. Here science education serves the reproduction of science by educating the scientific experts of tomorrow but it is also a tool for sustaining

the social hierarchy of expertise and epistemic authority of the scientific and other technical experts.

However, viewed from a pluralist perspective science and science education affect and concern all members of society, not only the scientific experts. For instance, the *scientific citizenship*-approach (Chapter 2, Section 2.2.1.) aims at the citizens (but also at the experts): this approach takes the relevances of citizen into account and wants to empower citizens to make use of science in a way that it becomes relevant and useful for their own lives. In this sense the citizens may actually become less dependent of scientific and technical expertise. Some science educators see themselves in an important brokering role at the interface between the scientific community and classroom communities, but not necessarily as compliant helpers of the scientific community (e.g. Moran, 2007). The *scientific citizenship*-approach therefore counters the view of science education that is exposed in Giddens' (2000) quote and uses also controversy and socio-scientific issues in science classrooms (Chapter 2, Section 2.2.2.) to address issues such as the uncertainty of new and controversial "science in the making" (Latour, 1987). In this sense the citizenship approach of teaching science puts scientific and other expertise into perspective and prepares the citizen of tomorrow for participation in informed decision-making processes also about issues concerning science and technology. It could be argued that this approach constitutes a challenge to the authority of scientific and other technical experts. In this sense it would not be surprising if these scientific and other technical experts publicly argued for an approach of teaching science as factual, certain and reliable knowledge and the need to leave science to the scientific experts.

How science education is represented in the media is an under-explored topic. However it is likely that various expert sources use the media to promote their views about how science should be taught and potentially influence public attitudes and decisions about science education. It is also possible that media representations of science education have an influence on the choice of academic subjects by young people (e.g. Whitelegg, et al.,

2006). Hence, how science education is represented in the media is an important issue that should receive more analytical attention from social scientists and science studies scholars. These accounts alongside science education play a central role in the (re)construction of science and (scientific) expertise. The analysis of public debates about science education – for instance who is seen as having authority and expertise in talking about science education and what purposes of science education are promoted in public debates – is an important initial step that can contribute to the establishment of a sociology of science education as a theoretical as well as an empirical research programme.

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# Appendix

## Appendix 3.1.: Coding schedule that was used for the quantitative analysis of media content

| | | | | | |
|---|---|---|---|---|---|
| **Number of article:** | | | | | |
| **Date:** | | | | | |
| **Newspaper:** | | | | | |
| **Author of text:** | | | | | |
| **Byline:** | | | | | |
| **Headline:** | | | | | |
| **Section of newspaper:** | | | | | |
| **Length (in words):** | | | | | |
| **Type of article:** | Report | Comment | Letter | Book Review | Other |
| | | | | | |
| **Country article refers to:** | UK | USA | UK and USA | UK and other country than USA | Other country |
| | | | | | |
| **Directly quoted expert sources :** | Scientific experts, organisations and institutions | | | | |
| | Educational experts, organisations and institutions | | | | |
| | NGOs, campaigners and action groups | | | | |
| | Politicians, authorities and other officials | | | | |
| | Religious experts, texts and institutions | | | | |
| | Media professionals and organisations | | | | |
| | Parents and/or pupils | | | | |
| | Other experts | | | | |

**Appendix 3.2.: Core set of question that the interviewed media professionals were asked in the interviews**

- Which are your professional fields of interest/expertise (and why)?
- How many years have you been working as a journalist/specialist correspondent?
- Concerning the debate around Emmanuel College, what were the key issues?
- According to your experience what was it that made this issue newsworthy?
- Why have you reported this issue?
- Where did you get your information from about this issue and how did you approach this story?
- Which sources and experts are in your opinion of particular importance in this story?
- How do you get in touch with your sources and experts?
- How do you assess information provided by your sources and experts?
- How do you select which quotes get in the reports?